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Telephony

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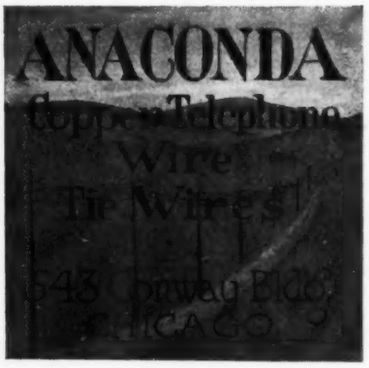

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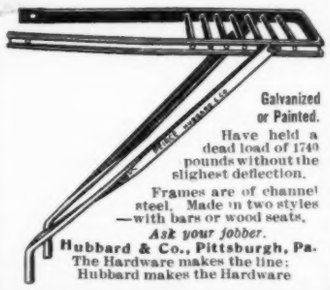

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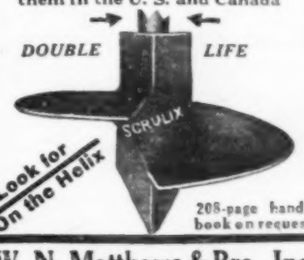

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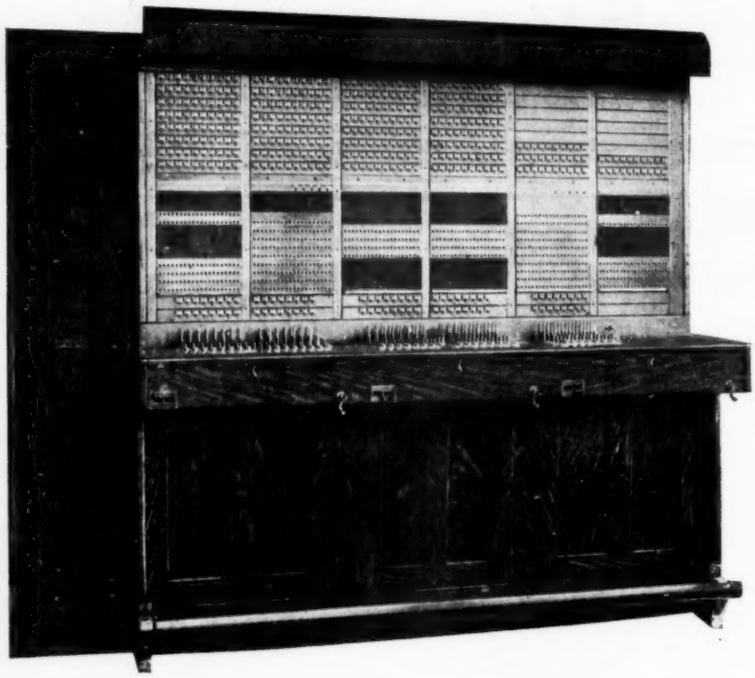

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Telephony.

THE AMERICAN TELEPHONE JOURNAL

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CURRENT OPINIONS AND COMMENTS

Commenting from time to time on the attitude of rate commissions toward telephone companies and other public utilities, TELEPHONY has found it necessary and logical to criticize adversely the policy of some of the state utility commissions.

Through fear of possible public wrath, or a foolish notion of winning political favor, these utility commissions have ignored plain facts and denied the relief to which public service corporations were entitled. Such short-sighted acts have been condemned in these columns, without, however, in any sense objecting to the theory of commission regulation.

It is an agreeable task, also, to call attention to a state commission which sees its duty, and does it, regardless of the objections of newspapers and politicians who know or care little about the merits of the case, but who attack the commission and the utility company because they consider it the popular thing to do.

Reference is made to the New York Public Service Commission which recently handed down a decision allowing the Rochester Telephone Corp. to charge temporary rates on a metered basis for business telephones in the city of Rochester.

* * * *

The Rochester company took over the Bell exchanges in that territory and desired to change the business telephones from a flat-rate basis to a measured service as a more equitable and satisfactory plan of operation. Strong opposition developed. Certain newspapers with demagogic leanings raised a great hue and cry, and the city authorities were induced to petition the state commission to continue the flat rate.

The commission, however, ruled in favor of the telephone company, and based its decision on the well-established ground that flat rates are discriminatory. In so doing, the New York Public Service Commission agreed with the utility boards of other states, and, above all, showed that it had the courage and back-bone to do what it believed was right and just in the face of violent opposition which, as usual, led to the calling of harsh names and to accusing the service company of all sorts of piratical motives.

* * * *

The commission was not deterred by the inference that it would be charged with being a party to that time-worn bogey of a "corporation grab," but investigated the facts and ruled according to the evidence.

Such exhibitions of courage on the part of commissions are refreshing, and should be commended. After the Rochester decision was rendered, the political and newspaper attacks waxed more fierce, and the commission was accused of being an ally of corporations seeking to "plunder the public."

It was the same old propaganda employed by all demagogues to appeal to unthinking people and "bunco" them into the belief that said demagogues were fighting their battles against "vested capital."

Commissions exercise functions similar to those of courts of justice, but, unfortunately, they are more subject to reckless criticism. No one—not even yellow newspapers nor self-seeking politicians—would hardly venture to intimidate a judge on the bench before he ruled on an important matter, or to assail him savagely after his court had rendered a decision. There would be no security of justice if the courts were subject to such outrageous attempts to sway their opinions.

Yet that is the kind of tactics employed in certain quarters to brow-beat rate commissions and terrorize them into denying utilities adequate compensation. The better class of newspapers—those which really try to serve the community—should use their influence toward insuring the commissions the same independent, untrammeled position which all courts of justice are supposed to occupy.

* * * *

In discussing this phase of commission control and the Rochester case, the editorial section of Public Utilities Reports, in its latest issue, said:

"The great work that commissions are doing is much misunderstood. It was so much misunderstood in California as to occasion a legislative investigation which ended in a vindication of the commission by the members of the legislature who were hostile to it at the outset. The editor of one of the leading newspapers of Rochester asked us the other day if we could name a single decision of a state commission that was not in favor of the corporations.

"Could anything be more amusing to one familiar with commission work? Fully three-quarters of all the decisions of the commissions have been against the contentions of the corporations. Investors in public utility securities will probably agree that commissions have been far from liberal with the corporations in the matter of fixing their return; but an examination of the decisions will show that these bodies have consistently refused to become public utility wreckers.

"One of the greatest services they have performed to the public has been the elimination of discriminations of various kinds in the fixing of rate schedules.

"Notwithstanding the great importance of their work to public welfare, commissions in various parts of the country have been subjected to misrepresentation and abuse because of the fact that during a period of abnormally high operating costs, they were compelled to increase rates, or because of the fact that in eliminating discrimination, they withdrew certain unfair privileges which had been enjoyed by municipalities or by large consumers at the expense of the average small user.

"We have mentioned this before and shall continue to allude to it until we drive home the importance of educating the public to the great service that is being performed for it by the commissions. The public does not understand what the commissions have done and what they are doing. If they did, such violent attacks as we have referred to would not be tolerated.

"Acquainting the public with the truth is not an easy problem, however, in the face of the hostile sentiment which has been created against corporations by skillful propaganda fostered by politicians and by far too many newspapers; but it is a problem which must be solved. If commissions are permitted to become in bad favor with the public, we must look for local control or municipal ownership, either of which would be an economic blunder, very costly to the average consumer."

* * * *

In line with the trend of telephone events which leads to the elimination of competition no longer necessary, and towards the greater stabilization of the telephone industry, is the final order of the Illinois Commerce Commission authorizing the consolidation of the rival exchanges at Jacksonville, Literberry, Alexander, Carrolton, Roodhouse and White Hall in that state.

In these towns both the Illinois Telephone Co.—a strong, successful independent concern—and the Illinois Bell Telephone Co. have maintained competing plants for years. Economic pressure and the desire of the telephone-using public to have a united service led the rival companies to plan for a consolidation. Their negotiations were successful, and the state commission has now approved the deal, which means that the Bell organization will withdraw from the towns named.

The Independent company will take over the consolidated properties and furnish an enlarged and better service to these communities. The Illinois Telephone Co. is now situated so it can devote its entire energy to serving its patrons without regard to harrassing rivalry, and the result should be profitable to both the company and the public.

A similar action is reported from Hillsboro, Texas, where the local exchanges of the Southwestern Bell and the Hillsboro Telephone Co. have been merged under the head of the Texas Telephone Co., which will supply a united service. These two instances seem to bear out the contention of Chas. S. Norton, in his article in TELEPHONY two weeks ago, to the effect that co-operation is the order of the day in the telephone field.

Principles of Telephone Traffic

One of a Series of Articles Setting Forth the Fundamental Elementary Principles of Telephone Traffic Work—Every Operator and Manager Shou'd Read These Articles—This Article Discusses the Local Operating Phrases

By E. L. Gaines

Traffic Superintendent, Home Telephone & Telegraph Co., Ft. Wayne, Ind.

Hundreds of standard phrases for local operating are in accepted use today, varying according to types of equipment and classes of service. The phrases given in this article are those most generally used in what may be termed the average office.

For the sake of convenience the operation of a common battery switchboard equipped with manual listening and ringing and standard supervisory signals will be considered.

The operator should answer all line signals by saying:

1. *"Number, please?"*

This phrase has been so universally adopted that there is no longer any question as to its being the proper answering phrase. If no response is given, the operator should repeat the phrase.

If the call is given by name instead of by number, or if the operator does not understand the number, she should say:

2. *"What number, please?"*

In requesting a number, the rising inflection of the voice should be used to indicate that a question is being asked.

If a subscriber persists in calling by name instead of by number, the operator should say:

3. *"I will give you information."*

And connect him with the information operator.

When answering a supervisory signal, the operator should say:

4. *"Operator."*

If no response is received, she should then say:

5. *"What is it, please?"*

Subscribers should be taught, by means of directory publicity and whatever other means may be necessary, to give their numbers plainly and distinctly, and to separate the numbers into their digits.

The operator upon receiving a number from the subscriber should repeat the number slowly and distinctly, giving the subscriber ample time to verify the number or to correct an error. The operator should separate the digits of the number into groups consisting of two figures each, as "Two three—four six." If the number consists of only three figures, the last two figures should be grouped together, the pause always being made after the hundreds digit.

Before completing a connection in the multiple, the operator should test the called line by tapping the rim of the jack with the tip of the plug three times, resting the plug on the rim of the jack at the third tap, and plugging in if the line does not test busy.

When reporting a busy line, the operator should say:

6. *"The line is busy."*

If at the end of 30 seconds after a connection has been established, the supervisory signal shows the called party has not answered, the operator should go in on the connection and say:

7. *"I am ringing."*

The same report should be given at 30-second intervals until three such reports have been given. At the end of the last 30-second period, the operator should say:

8. *"They do not answer."*

If after a "Don't Answer" report is given, the subscriber requests the operator to continue trying to get the number called, the operator should say:

9. *"I will ring them again."*

When a subscriber reports that his bell rang, the operator should say:

10. *"There is no one on your line now. Will you excuse it, please?"*

When a party line subscriber calls for a station on his own line, the operator should say:

11. *"Hang up a moment, please, while I ring."*

If a subscriber cannot hear on a connection, the operator should say:

12. *"One moment, please."*

and change the cord pair in use.

If, after completing one conversation, the calling party flashes and asks for another number, the operator will proceed as with a new call. If, however, the called party desires to make a call, the operator should take down the connection. This allows the called party's calling signal to be displayed in its regular position on the switchboard. His call will thus be answered and handled by the operator on that position.

Should the operator, who handled the first call, attempt to change cords and establish the second connection, the called party's light would appear before his regular operator and confusion would result from there being two operators on the line at once.

When anything unusual occurs on any connection such as the subscriber attempting to argue with an operator, the call should be immediately referred to the supervisor.

If the subscriber complains of being disconnected while talking, the operator should say:

13. *"I beg your pardon. With what number were you talking?"* and proceed to re-establish the connection, unless the called line tests busy. If the called line tests busy, the call should be referred to the supervisor, who will either complete the connection over the busy test or at a later time. Subscribers should be taught that, in case of a disconnect, the called party should immediately hang up and let the calling party have the connection re-established.

If the calling party hangs up before the called station answers, the operator should leave the connection up for 30 seconds and if the called station answers should say:

14. *"The party who called you has left the line. Will you excuse it please?"*

If the called party asks who called him, the operator should give the number of the calling line.

When an operator rings a subscriber by mistake, she should say:

15. *"I beg your pardon, you were called by mistake."*

When an operator thinks a line is in trouble, she should report it to her supervisor.

If an operator's name is requested by a subscriber, she should say:

16. *"My number is—" (giving her number).*

If the subscriber still persists in obtaining the name, the call should be referred to the supervisor. Personal numbers should be assigned all operators and an operator should never give her name to a subscriber.

PLEASURE.

The amount of pleasure that there is in this world can never be measured. The philosophy of life is reciprocity and a man gets what he gives.—Chauncey M. Depew.

Where it is necessary to trunk calls, the *A* operator, after selecting the proper order-wire routing, should pass her call to the *B* operator, taking care to give the number deliberately and distinctly, separating the hundreds group from the last two figures of the number. The *B* operator, upon receiving the order, should assign a vacant trunk. If the *A* operator does not understand the number of the trunk assigned by the *B* operator, she should say:

17. *"— — (called number). What trunk?"*

If the *B* operator does not understand the number, she should say:

18. *"Repeat."*

If she does not understand after the second request, she should assign a trunk and refer the call to the supervisor.

A *B* operator should never refuse to assign a trunk to an *A* operator requesting the assignment due to the *A* operator's using irregular routings. The trunk should be assigned and the irregularity reported to the supervisor.

A *B* operator should never repeat the called number except when it is necessary, due to the *A* operator's breaking.

If the subscriber requests the operator to continue trying to get the called party on a trunk connection, or complains he cannot hear, or reports anything that may be affected by trunk equipment, the *A* operator should say:

19. *"What number are you calling, please?"*

When the subscriber gives the number, the *A* operator should say to the *B* operator,

20. *"Change — —" (number wanted),* and establish the connection over the new trunk assigned.

If on a trunk connection the called party has not answered when the call has been supervised the third time, the trunk in use should be changed.

To the foregoing 20 phrases, three others must be added for magneto operation, owing to the lack of automatic supervision. After ringing with magneto equipment it is necessary for the operator to go in on the circuit at 15-second intervals to see if the called party has answered, before ringing again. If not sure whether the called party has answered, the operator should say:

21. *"Did they answer?"*

If a negative reply is received, the operator should use phrase No. 9, *"I will ring them again."*

When answering a supervisory signal on a magneto board, phrase No. 4, *"Operator"*, should be used. If no response is received, the operator should then say:

23. *"Are you waiting?"*

After giving ample time to respond, the operator should then say:

24. *"Are you through?"*

If no response is then received, she should proceed to take the connection down.

When a switchboard is equipped with automatic ringing and revertive ringing tone, phrases Nos. 7, 8 and 9 are eliminated, in addition to the operator being relieved of the labor of operating the ringing key. The subscriber is automatically informed by means of the ringing tone each time the called party is rung, thus the operator is also relieved of the necessity of using phrase No. 7.

The subscriber may wait as long as he pleases for the called party to answer and when he finally concludes they are not going to answer, may use his own initiative in abandoning the call. Phrase No. 8 is thus unnecessary as well as phrase No. 9.

Where automatic listening is provided the extra labor involved in operating the listening key on each connection is eliminated. Where automatic ringing and listening and the revertive ringing tone are used, what is called dark supervision is usually provided whereby no supervisory light appears until the call is abandoned.

Owing to the fact that the ringing is automatic and the calling party is automatically informed of the condition of his call, it is unnecessary for the operator to know whether or not the called party has answered. The elimination of all unnecessary signals on the keyshelf makes the operation much easier and every signal displayed means that the operator's attention is needed immediately.

There can be no question of the many advantages of late switchboards equipped with automatic features. Each phrase or operation eliminated means just that much faster and more economical operation.

Satisfactory Home-Made Test Box

If You Have No Wire Chief's Desk, Here Is a Description of a Home-Made Test Box that Has Worked Satisfactorily in Small Magneto Exchanges — Materials Entering Into Its Construction and How It Is Used

By F. H. Griffith

The test box illustrated and described on this page is designed for use at small magneto exchanges where the repairman must do his own testing without the aid of a test-board man and equipment used at larger exchanges.

It is a home-made affair and is made up of equipment usually available at any telephone exchange. An exception to this may be the voltmeter which for best results should have 10,000 ohms' resistance and a 30-volt scale. However, one of the three sets we have made and which are now in use has a voltmeter with a three-volt scale and gives fairly good results.

The box is made of white pine, sandpapered down, stained and given two coats of varnish. Wired as shown in the circuit diagram, it is possible to make all the tests that the repairman will need. While a repairman is able to recognize various kinds of line trouble by listening in, ringing, etc., a voltmeter test more surely indicates the nature of the trouble and approximate location.

After becoming familiar with the voltmeter readings obtained on the lines under normal conditions and those obtained on various cases of trouble, the repairman can soon tell the exact nature of his trouble and, in some cases, the approximate location. The time saved by this knowledge will soon repay the cost of making the test set.

In clearing of high resistance trouble, such as tree grounds, wet cable pairs, damp house wire, etc., a test set of this kind is invaluable, as it is difficult to locate trouble of this nature without good testing equipment.

The box is made in two parts, the hinges allowing the larger compartment, in which the equipment is mounted, to swing open so that it is readily accessible. The equipment consists of a voltmeter, three double-acting keys, 100-ohm drop complete, telephone set with operator's head receiver jack, transmitter cut-out key and, in some cases, an order-wire key for connecting to the switchboard operator circuit.

The wiring in the box is brought to nine terminals or binding posts for outside connections. Posts Nos. 1 and 2 are wired to the switchboard operator circuit, in case the test box is not located in the operating room. Nos. 3 and 4 are wired to a 30-volt battery of dry cells and No. 5 to ground. Nos. 6 and 7 are the tip and sleeve of the test line and are wired to flexible cords at the cross-connecting frame.

These cords should have tips that will fit in the fuse clips on the frame so that any line may be quickly tested with the office equipment disconnected by removing the fuses. These two binding posts should also be wired to a cord and plug on the switchboard so that any line may be tested from the line jack. Nos. 8 and 9 are wired to a source of power for ringing. If a hand generator is used on switchboard for ringing, a generator box can be mounted near the test box and wired to these terminals.

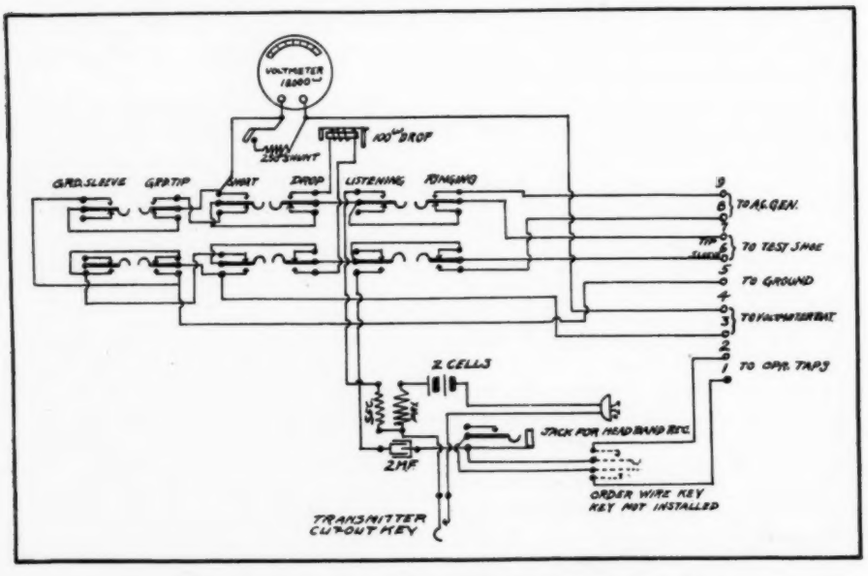
The subscriber's telephone can be called and tested for ringing, talking and signaling, either by connecting through the cords at the cross-connecting frame or through the line jack by using the cord on the switchboard.

General Appearance of Set.

Referring to the wiring diagram, to signal the subscriber, the key contacts marked "ringing" are operated, connecting the generator to the test circuit and ringing the bells. The key contacts marked "listening" are then operated, connecting the telephone circuit to the test line. The receiver terminals of the telephone circuit are wired to a receiver jack similar to the one used on the switchboard so that the same head receiver and plug provided for the generators may be used. By holding the transmitter cut-out key depressed, the set is ready for conversation.

To test the subscriber's telephone for signaling, operate the key contacts marked "drop" and a drop similar to one on the switchboard is connected to the test line and strength of the subscriber's signal may be noted.

When the key contacts marked "short" are operated, the voltmeter is connected in series with 30 volts of battery across the tip and sleeve of test line. It must be remembered that the ringer coils of the telephone instrument are bridged across the line and a deflection of the



Wiring Diagram of Efficient Home-Made Test Set.

voltmeter will always be obtained, but with a little practice the repairman can tell whether the reading is not normal. If the line is "open," there will be no deflection and if it is "short," the deflection will be above normal.

To test for a cross with ground, the key contacts marked "Grd tip" are operated which connects the voltmeter in a series with 30 volts across ground and the tip side of the test line.

When the key contacts marked "Grd sleeve" are operated, the sleeve side of the test line is connected to voltmeter in a sries with battery to ground. Under normal conditions, there is no connection on a metallic line with the ground and no deflection will be obtained.

A low-resistance shunt must be provided that can be cut across the terminals of the voltmeter in order that more of the scale will be available for comparing the resistances met in ordinary practice. As the current necessary to deflect the voltmeter needle, full scale, is very small, there will be very little difference between the readings obtained on 2,500 ohms and 100 ohms. However, when the shunt is bridged across the voltmeter while on the 2,500-ohm test, the needle will drop back several volts. While on the 100-ohm test, it will remain nearly the same.

There are numerous other tests that can be made with this set once the repairman is familiar with its actions and he will find it invaluable.

Vision of Wireless Telephone Possibilities Presented.

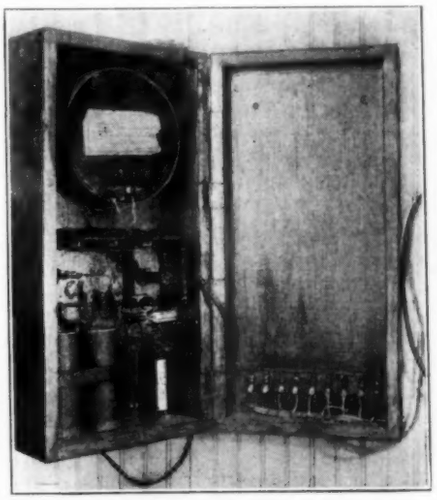
National conventions which the delegates can attend without coming together in a humid auditorium and at which the entire nation can hear every word that's said; sessions of congress with the senators and congressmen scattered over the country at their homes or offices or summer homes; concerts, church services and public speeches with audiences numbering millions—such was the vision revealed recently by Hiram Percy Maxim, inventor of the Maxim silencer and president of the American Radio Relay league.

Mr. Maxim delivered the opening address at the convention of the league, held in Chicago, and told the 2,000 wireless amateurs assembled from all parts of the United States and Canada that they were making history.

The time is not far distant, he predicted, when voices in the air will reach from continent to continent, ringing across the wilderness of land and sea.

"Some day this sort of a convention will never be held," said Mr. Maxim. "The delegates will sit in their own homes and listen through the radio telephones to what the officials may have to say. The officials will meet and direct the convention through these telephones.

"The nation will transact its business over the wireless telephone. The capitol at Washington will be only a figurehead. Parliamentary rules will be observed just as they are today in the senate chamber,



Interior View of Test Set.

but the walls of this chamber will be extended to the boundaries of the United States.

"The gentleman from North Carolina or from South Carolina or from Texas will obtain the 'floor'—or the ear of the presiding officer—by wireless. He will deliver his speech on the tariff or the supplementary Volstead act. The gentleman from Maine or Mississippi will reply. The entire debate will be conducted over the wireless telephone and any citizen may listen in and hear plainly every word that's said.

"Singers, instrumentalists, preachers and orators will sing, play or speak to millions. Their influence will be magnified thousands of times. The farmer in his shack on the western prairies can recline in his easy chair after his work is done and hear President Harding's address at some great public celebration.

"Generals can inspire their armies on the field of battle. It will not be necessary to go to church. The clergyman of the future will carry his message direct to the home. You can converse with friends in midocean or in distant lands."

The wire telephone, Mr. Maxim stated, still has its field, and will continue to serve the public for some time to come.

The wireless direction of ships at sea already is an accomplished fact, Mr. Maxim stated, but their wireless propulsion was another matter.

"We will have to make some new discoveries," he said, "before we can transmit much power by radio."

London, England, Subscribers to Have Toll "Express" Service.

When the new "Toll" exchange now nearing completion in London, England, is finished, telephone subscribers there will be able to enjoy 30-mile connections at a minute's notice, which will be quite an innovation for Britain. The new exchange aims to give connection without going through the complicated "trunks" or "long distance" machinery, which has always been thought essential, before a London subscriber could speak to anywhere within the 30 miles radius of the metropolitan center. All long distance traffic will be taken into a newer and simpler system for the 30-mile radius.

Outside the area of a subscriber's own exchange all calls now, whether in the London area or not, are "trunk" calls, so far as the fee he is called upon to pay is concerned. Distance is what the British telephone authorities now base their charges on. Whether connection is established in one minute, or one hour, makes no difference. All those towns within 30 miles of London will now come under the operation of the "Toll" trunks.

Instead of the present procedure of putting in a call and waiting to be rung up by "trunk," the subscriber will ask for "Toll" through his local exchange. "Toll" will have direct trunk lines to all towns and, provided they are not engaged, will plug through in the same way as connections are now made between the ordinary London exchange and suburban exchanges. All this means that the subscriber, in future will say:

"'Toll', please."

"Toll" exchange will say: "Number please?"

The subscriber will say: "Chelmsford 4520."

And "Toll" exchange will say: "You're through!"

This new exchange will be working in the fall. The October issue of the telephone directory will contain a supplementary list of all towns within the "Toll" boundaries.

London telephone users are beginning to take hope, for, with the advent of this "Toll" exchange the telephone service generally seems to be improving. Figures for the first six months of the present year are encouraging compared with previous reports. The percentage of "cut-offs" has decreased since last year from one in 222 calls to one in 192. The percentage of wrong numbers improved by 3.85 to 4.1.

'Orate' Across Two States by Wireless and Sound Amplifiers.

Separated from their audiences by the width of the states of Wisconsin and half the width of Iowa, Governors Kendall of Iowa and Blaine of Wisconsin, by the use of wireless telephones and sound amplifiers, exchanged greetings with one another. Each spoke to the crowds at the other's state fair.

Governor Kendall spoke first, addressing the crowds at the Wisconsin state fair at Milwaukee. Governor Blaine replied within a few minutes after the Iowa executive at Des Moines had concluded.

Reserve Account for Depreciation

"Depreciation Should be Guarded Against by a Reasonable Charge to Operation Spread Over Normal Life of Properties" — Reinvestment of Accumulations— Paper Presented at the Annual Meeting of the Florida Telephone Association

By A. B. Steuart

The subject of depreciation opens up a wide field of varying, and it might be said, conflicting opinions. From an accounting standpoint purely, one would be concerned only as to the ratio of depreciation of a plant unit that cannot be made good by repairs. It is advisable to define exactly what the word "depreciation" itself is intended to convey in its broadest sense.

Referring to the dictionary we find the meaning of depreciation defined as follows: "The act or state of lessening the worth—or the lowering of the value," and upon analyzing these explanations we necessarily determine that the reserve for depreciation, from an engineering point of view, contemplates a charge against operation to cover wear and tear, decay, inadequacy and supercession, as well as obsolescence, loss by storm, fire, flood, earthquake or cyclone, as all of these factors tend to lessen the worth or lower the value.

Plant and equipment through age gradually wear out, deterioration actually beginning the moment that an installation is completed. As such deterioration cannot indefinitely be made good by repairs, there comes a time when a complete renewal or replacement is necessary.

Deterioration in the case of certain units of a property is more rapid during the early life and slows up as age goes on. With other units in the same property, deterioration during early life is hardly noticeable, but towards the end of life increases quite rapidly. In either case, however, there comes a time when the unit is no longer serviceable and in the interest of economy it should be removed from the property.

An automobile, while it is not perhaps the best example in the consideration of telephone properties, is, nevertheless, a sufficiently good example for the purpose of illustration. The wear and tear on an automobile can be taken care of to some extent by a system of almost continuous repairs and replacement of parts. But even with continuous repairing, it reaches a stage where expenditures for repairs simply multiply the cost of operation until it becomes prohibitive. The logical thing to do at this stage is to replace the machine with a new one, and this is what might be termed "depreciation through wear and tear and decay."

Obsolescence contemplates depreciation due to changes, or scientific advancement and evolution, through the channels of research and invention which makes units of a plant, and sometimes even an entire property, obsolete and uneconomical for use.

This phase of depreciation, more or less speculative, is, nevertheless, a factor to be reckoned with in determining a fair rate of depreciation. As the history of the telephone business has been one of continuous progression, the type of plant and equipment in use yesterday makes way for the newer types of equipment in use today, and the prospect is always before us, that today's type will make way for a more efficient system in the future.

A. B. Steuart, of Tampa, Fla., Believes Every Company Should Provide Adequate Depreciation.

Under this same head must also be considered changes in properties, long before they have actually worn out or lived their normal lives in order to meet the requirements of city and county ordinances, and contingencies of a similar nature with which operating companies have to contend from time to time.

Depreciation because of inadequacy or supercession is a lessening of value which comes as a consequence of exceptional and unusual demands for service which even the best judgment in providing for future growth fails at times to foresee.

Plant and equipment become inadequate for their purposes in face of new conditions and unexpected developments compel the installation of entirely different types capable of more efficiently handling a greater capacity and in accelerating the service. Even in those cases where it can be foreseen, good business judgment suggests that the situation be met only when it arises, as otherwise over a period of years one of two things would result—either subscribers for service would be paying upon a large investment in costly properties not actually necessary or being used to give the service, or the operating companies would be suffering a loss during the time when such properties remained idle.

Depreciation through storm, fire, flood, earthquake or cyclone are all of sufficient consequence to be given consideration, for it sometimes happens that on occasions, wind storms tear down major portions of telephone properties, and heavy continuous rains are responsible for much deterioration, while fires are of frequent occurrence, utterly destroying properties located within subscribers' premises, and burning down pole lines.

Theoretical depreciation is the method of handling the charges against operation for all of the foregoing, as far as possible, uniformly over a period of time representing the actual or estimated life of the properties being considered.

The determination of rates, however, is largely a matter of judgment, as there can be no set rule to govern all properties any more than there could be a uniform method of handling or operating them.

A rate set for the age of properties can be determined largely by the time at which it is estimated a unit will become worn out. Wear and tear and decay can generally be determined in a plant that has been operating for a period of years by a reference to the plant records, and where this is not available, by visitation and inspection of the properties by a qualified engineer. However, wear and tear and natural deterioration of necessity varies according to the general climatic and soil conditions prevailing in the territory in which the properties are located.

Moneys invested in telephone properties are made for the purpose, primarily, of providing service, and not as in the case of an investment in raw materials intended for manufacture, for the purpose of providing a profit from their manufacture and sale. The price of the service to the public, for which the public feels the need, is, therefore, intended to cover the cost of the operation of the properties, as well as to provide a reasonable return on the investment.

Depreciation of plant and equipment in any of its various phases, unless it is taken care of by substitution of units, as

a material difference in the quality of the service rendered, as well as reduce the value of the property.

Both of these contingencies should be guarded against by a reasonable charge to operation spread over the normal life of the properties in the interest alike of continuous and good service, and the protection of the investor.

The procedure to be followed in handling the plant accounts affected by major replacements, because of the depreciation of the component parts of the properties, it might be said, is similar to that followed by the construction department.

For illustration, it has been determined that it is necessary to replace a pole line and a construction crew is authorized to perform the work incident to the construction of the new properties. This authorization contemplates and covers also the work incident to the removal of the old pole line.

It necessarily follows that when the major units of plant and equipment are taken out of the property, to make way for other and newer properties, the cost of the old properties originally charged upon the books should be determined, and this amount should be written out of or credited to the plant accounts at the same time that the charge is made to the plant accounts for the new properties.

Loss representing the difference between the salvage value and the original cost of the old properties, written out of the plant accounts, together with the cost of removal, should be charged to the reserve for depreciation, which should have accumulated for this very occasion during the period of time in which the units have been helping to furnish service.

It is a common practice among operating companies to reinvest accumulations in the depreciation reserve account, in current additions and extensions to their own properties, replenishing the fund when necessary by the issuance of additional capital securities. However, the method of handling the funds and the accounting practice generally is subject matter for another and more exhaustive paper.

Operation of Class A Companies for Month of May.

The Interstate Commerce Commission has recently compiled the comparative summary of operations of 68 Class A telephone companies from reports filed with the Bureau of Statistics, shown in the table on this page, for the month of May, 1921, and the five months of this year.

It will be observed that the ratio of operating expenses to operating revenues in May, 1921, was 71.06 per cent, while in May, 1920, the ratio was 76.46 per cent. During the five-month period ended with May, the ratio was 72.54 per cent in 1921 and 74.63 per cent in 1920.

Reference to the reports compiled by the commission since the first of this year shows a steady decrease in operating expenses; i. e., in January, 1921, operating expenses increased 15.6 per cent over the preceding year; in February, 11.3 per cent; March, 7.2 per cent; April, 5.5 per cent; and May, 3.4 per cent.

Traffic expenses also show a decrease, for in January they had increased 25 per cent over the preceding year; in February, 16.1 per cent; March, 9.1 per cent; April, 5.5 per cent; and May, 4.1 per cent.

Class A telephone companies show an increase of 570,359 instruments for the month of May, bringing the total number in service on May 31 up to 9,526,900.

Immense Garage to Be Erected By Southern California Company.

The erection of a $150,000 brick garage at Los Angeles, Calif., 250x60 feet, modern in every respect, will be made in the very near future by the Southern California Telephone Co., according to present plans. The new structure will contain only a basement and the first story, but will be so erected as to make it possible to add several other stories at a later date. The company has already applied to the state railroad commission to pay the Mercantile Fireproof Building Co. $150,000 for the site.

In addition to a large space for vehicles, the building will be fully equipped with machine shops, paint shops and other accessory departments to a well-equipped garage. Although the railroad commission has not yet had time to pass upon the request for permission to erect the building, it is taken for granted by the company that the project will be approved at the hearing to be held September 21.

"It has been necessary to double our motor vehicles and in consequence thereof we are building a new garage," says N. R. Powley, the company's commercial superintendent, in commenting on the company's plans. "We have applied to the commission for permission to do this.

"It has not only been necessary to double the motor vehicle equipment used by the construction force but it has been necessary to triple the construction force itself. The number of telephone installers has been practically doubled as has been the force of engineers whose duties are to lay out every detail of the construction program and correlate the receipt of material with the man power available to do the work."

Item.	For the month of May		Increase or decrease(*).		For the five months ending with May.		Increase or decrease(*).	
	1921	1920.	Amount.	Ratio, Pct.	1921.	1920.	Amount.	Ratio, Pct.
Number of company stations in service at end of month	9,526,900	8,956,541	570,359	6.4	.....	.....	.....	....
Revenues:								
Subscribers' station revenues	$29,548,267	$25,168,206	$4,380,061	17.4	$141,966,503	$121,319,433	$20,647,070	17.0
Public pay station revenues	2,012,761	1,931,985	80,776	4.2	10,233,457	9,676,250	557,207	5.8
Miscellaneous exchange service revenues	406,642	374,461	32,181	8.6	2,059,368	1,852,877	206,491	11.1
Message tolls	11,459,379	11,535,802	*76,423	*.7	55,451,910	55,530,824	*78,914	*.1
Miscellaneous toll line revenues	1,266,621	1,176,346	90,275	7.7	6,306,645	5,673,705	632,940	11.2
Sundry miscellaneous revenues	647,666	581,330	66,336	11.4	3,235,893	2,553,534	682,359	26.7
License revenue—Cr.	1,726,904	1,475,213	251,691	17.1	8,694,942	7,054,955	1,039,987	14.7
License revenue—Dr.	1,725,645	1,473,672	251,973	17.1	8,088,799	7,049,028	1,039,771	14.8
Telephone operating revenues	$45,342,595	$40,769,671	$4,572,924	11.2	$219,259,919	$196,612,550	$22,647,369	11.5
Expenses:								
Depreciation of plant and equipment	$ 6,294,571	$ 6,170,737	$ 123,834	2.0	$ 30,973,709	$ 30,370,830	$ 602,879	2.0
All other maintenance	6,653,250	6,489,491	163,759	2.5	31,556,938	29,504,792	2,052,146	7.0
Traffic expenses	13,172,228	12,659,219	513,009	4.1	65,521,133	58,743,826	6,777,307	11.5
Commercial expenses	4,271,700	3,966,532	305,168	7.7	20,950,001	19,123,250	1,826,751	10.0
General and miscellaneous expenses	1,826,954	1,885,566	*58,612	*3.1	10,057,097	8,995,720	1,061,377	11.8
Telephone operating expenses	$32,218,703	$31,171,545	$1,047,158	3.4	$159,058,878	$146,738,418	$12,320,460	8.4
Net telephone operating revenues	$13,123,892	$ 9,598,126	$3,525,766	36.7	$ 60,201,041	$ 49,874,132	$10,326,909	20.7
Other operating revenues	3,541	4,391	*850	*19.4	18,010	25,341	*7,331	*28.9
Other operating expenses	2,295	3,414	*1,119	*32.8	15,249	20,504	*5,255	*25.6
Uncollectible operating revenues	165,789	124,287	41,502	33.3	732,043	644,839	87,204	13.5
Operating income before deducting taxes	12,959,349	9,474,816	3,484,533	36.8	59,471,759	49,234,130	10,237,629	20.8
Taxes assignable to operations	3,191,381	2,600,337	591,044	22.7	14,804,438	12,806,870	1,997,568	15.6
Operating income	$ 9,767,968	$ 6,874,479	$2,898,489	42.1	$ 44,667,321	$ 36,427,260	$ 8,240,061	22.6
Ratio of expense to revenues—per cent	71.06	76.46	*5.40	*7.1	72.54	74.63	*2.09	*2.8

Summary of Operations of 68 Class A Companies for May, 1921, Compiled by the Interstate Commerce Commission.

"Telephony's" Home Study Course for Telephone Men

A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Jay G. Mitchell

Quiz Questions on the Preceding Installment.

1136. What is the position of the switch-wiper shaft when the series of switch-driving impulses *from the operator's equipment* is complete? What effect upon slow-acting relay *B*, Fig. 321, results from the termination of the series of impulses? What is the normal condition of the two make contacts at *I*, Fig. 321? How are the contact springs at *I* operated?

1137. When is relay *G*, Fig. 321, operated? Trace the circuit over which energizing current flows to the winding of relay *G*. What is one operating function of relay *G*? With which relay of the circuit arrangement shown in Fig. 320 may relay *G*, Fig. 321, be compared? What is the relation between the test wipers, 4 and 5, and the winding of relay *G*? When does the control of relay *G* pass away from relay *L*?

1138. When is the circuit completed for a flow of current through the winding of the vertical stepping magnet? Trace the energizing circuit of the vertical stepping magnet. When the vertical magnet is energized and its armature operated, what agency interrupts the flow of current through its winding releasing the armature in readiness for another step?

1139. When the first set of bank contacts in the row is associated with a trunk circuit that is "busy", what effect is produced upon relay *G* which would otherwise be restored to its normal condition? When relay *G* is released, is the further vertical motion of the switch-wiper shaft arrested? When the vertical motion of the switch-wiper shaft is arrested, how is the connection between the test-bank contacts of the seized trunk and the positive or grounded terminal of the common battery, established? What does such a connection, once established, effect? When are the normally-closed off-normal contacts *J* and *K* operated? What are their primary functions?

1140. What is a possible operating condition during periods of abnormally heavy traffic? What is necessary when all the trunk circuits of an intermediate trunk group are busy? How is the vertical motion of the switch-wiper shaft arrested in such a case? Is the same general scheme used for all intermediate switch groups between the line-finder and the connector?

[AUTHOR'S NOTE: Through an oversight in reading proof, errors were allowed to appear in lines 1 and 13 of the second paragraph of section 1139. The word "contacts" in line 1 should be "wipers" and obviously the word "non-grounded" in line 13 should be "grounded."]

CHAPTER XXXIII. Operating Combinations, Including Switching (Continued).

1141. *Relation of switches to system capacity.*—When the intermediate selector has arrested its wipers on the bank contacts of an available trunk, the selections required to conform with the first two digits of the called number will have been completed. Should it happen that the system in which the call is being made is of a size to be properly served by *four-digit* telephone numbers, then the succeeding switching equipment will be of a type different from that shown schematically in Fig. 321.

In that case the third digit of the called number will control the number of *rotary* steps to be taken by the next switch, and the fourth digit will fix the number of *vertical* steps to be taken. In other words, the next switching operation, in a four-digit system, would be the actual selection and connection with the individual called line circuit. The switching equipment with which this final connection is affected is called a "connector" and it performs somewhat different operating functions from those delegated to the switch equipments so far touched upon.

Should it happen that the system comprised enough line circuits to render the use of telephone numbers having a greater number of digits than four necessary, then the next selection would be identical, as far as mechanical operation of the equipment is concerned, with that partially described in connection with the circuit of the intermediate selector, Fig. 321.

It is worthy of note, however, that the intermediate selector circuit shown, requires the use of three wires for each trunk circuit between the switch banks at one terminal and the switching equipment at the other.

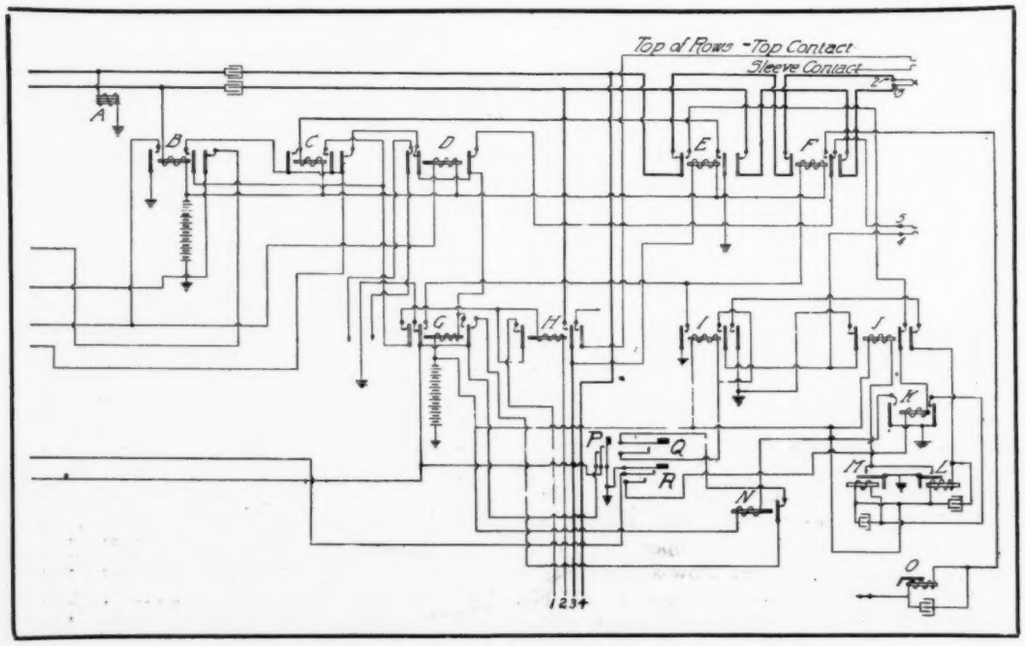


Fig. 320. The First Selector Circuit.

For this reason, the circuit arrangement would be somewhat different in case it was found necessary to install the first selector equipment. Fig. 320, in one building and the intermediate selector equipment, Fig. 321, in another.

In any event, the bank contacts leading to the connector switch equipment form a natural dividing point in the completed circuit between the calling and called telephone stations. As will shortly be explained, the calling subscriber controls the release and restoration to normal of all the switching equipment *except* the final conector.

The release of the connector equipment is controlled by the called telephone station. This provision in the circuit arrangement prevents the complete tie-up of the *called line* by an unreleased switch having wipers resting on its bank contacts when, for any reason, the first and intermediate selector equipment may function imperfectly in releasing.

1142. *The method of releasing.*—Referring to Figs. 319 and 320, the calling telephone current-supply circuit may be traced from the positive or grounded terminal of the common battery through the winding of current-supply relay *B*, Fig. 320, one side of the completed trunk connection to the calling telephone and return through the winding of current-supply reactance coil *A*.

As a result of the flow of current over this circuit, relay *B*, Fig. 320, is continually in the operated position as long as the circuit is closed through the hook switch of the calling telephone. When the calling subscriber replaces his telephone receiver upon its hook, the flow of current through the winding of current-supply relay *B*, Fig. 320, is interrupted and it is released.

The release of relay *B* interrupts the flow of current through the winding of slow-acting relay *D*, Fig. 320. The release of slow-acting relay D completes a path for a flow of current through the winding of relay *G*, traceable as follows:

Starting at the positive or grounded terminal of the common battery, the current passes through the normally-closed break contact of relay *J*, the wiper 4, the test-bank contacts 8 and 9, Fig. 321, the test wiper 5, Fig. 320, the normally-closed make-and-break contact of relay *F*, Fig. 320, the normally-closed break contact of slow-acting relay *D*, the winding of slow-acting relay *G* and the common battery.

When slow-acting relay *G* is operated, a circuit is completed for the flow of current through relay *F* and the normally-open off-normal contact springs at *P* (now closed). When relay *F* is operated as a result of the passage of current through the circuit traced, it completes a path for the flow of current in the winding of the release magnet *O*, traceable as follows:

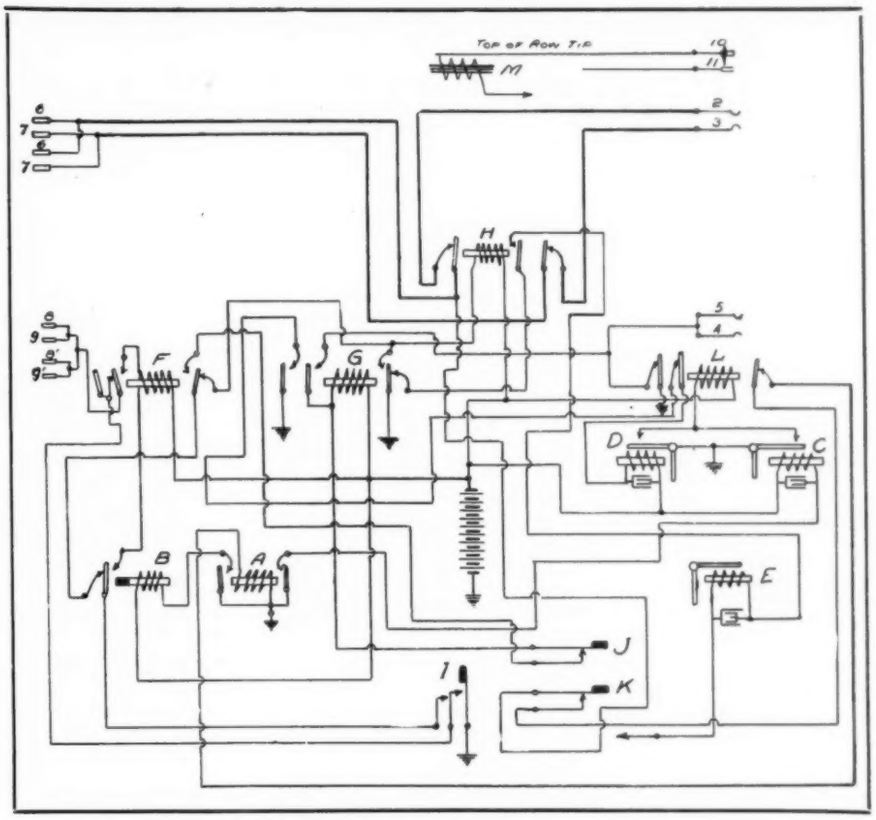


Fig. 321. The Intermediate Selector Circuit.

Starting at the positive or grounded terminal of the common battery, the current flows through the normally-open off-normal contact springs *P* (now closed), the normally-open make-and-break contact of slow-acting relay *G*, (now closed), the normally-closed break contact of slow-acting relay *D*, the normally-open make-and-break contact of relay *F* (now closed), the winding of the release magnet *O* and the common battery.

While the drawing does not so show, the terminal of the winding of the release magnet *O*, indicated by an arrow head, leads ultimately to the negative or non-grounded terminal of the common battery.

As an ultimate result of the replacing of the telephone receiver upon its hook at the calling station, the release magnet is energized and the first selector switch wipers 2, 3, 4, and 5 are permitted to pass down the row by gravity and then to move in the rotary sense to their normal position.

When the switch-wiper shaft reaches its normal position, the contact between the off-normal springs at *P* is interrupted. The circuit established when multiple-contact relays *L* and *N* are operated, in the selection of the calling line circuit by the line-finder, through their own coils and the normally-open make contact of the unmarked slow-acting relay at the lower right-hand corner of Fig. 319, which is continued through the off-normal springs at *P* after the first selector switch-wiper shaft has taken its first rotary step, is definitely broken when first selector switch-wiper shaft is restored to its normal position. As a result, multiple contact relays *L* and *N* are released and the line and trunk equipments are restored to normal in readiness for another call.

(To be continued.)

Ants Eat Into Underground Cable in New South Wales.

Officers of the Australian telephone repair service in New South Wales, seeking a trouble which, after the rains, had interfered with 59 telephones, made the unique discovery of white ants among the wires in an underground cable.

A cable buried 18 inches was found to contain a hole the size of a small pea, and indications were that white ants had eaten through the lead, causing the leak. When laid down, each separate wire was wrapped in paper; the whole of the wires were also wrapped in paper, and encased in lead weighing 7 pounds to the square foot.

The lead was covered with soft paraffin, and then the whole cable was covered with timber which had been specially treated with arsenic and tar. The paper inside the cable was eaten by white ants.

This is believed to be the first occasion upon which white ants have been known to bore through the telephone cables in New South Wales, although a parasite known as "the borer," in Queensland, is said to have often caused similar trouble.

Telephone Installation Glimpses

Bank Has a Combination Automatic and Manual System.

First installation on the Pacific Coast of a combined mechanical and manually-operated telephone system with a capacity of 640 telephones will be accomplished when the branch exchange at the new Bank of Italy building, Market, Powell and Eddy Streets, San Francisco, Calif., is completed.

The entire system can be used without the assistance of an operator if desired, but the arrangement has been so modified that it is also possible to have complete control in the hands of an operator as well. Nothing of the sort has been seen so far in Coast telephone devices, and in only a few of the larger Eastern institutions has installation been made.

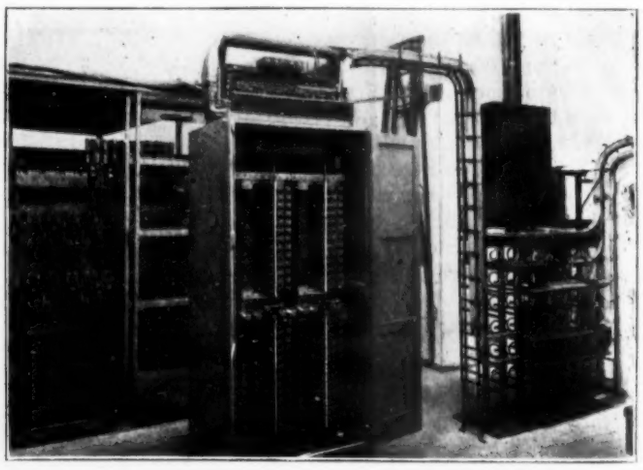
Enough wire is used in this equipment to supply a trolley line from San Francisco to Los Angeles—the exchange room alone, requiring more than 2,000,000 feet of various kinds of wire. In addition, some 300,000 feet are used to connect the many inside telephones on the various floors, not to mention the amount of wire in the incoming cables. In all, there are 66 different sizes of wire, ranging from the finer varieties, smaller than a human hair, to the main cable, as large as a man's wrist. Twelve types of cable are used, the largest containing more than 600 small wires, each wire being individually insulated with a combination color scheme for identification, entirely different from the others.

Calls can be handled automatically at the rate of approximately one every three seconds though the actual limit is governed only by the number of incoming lines. If desired, this can be increased to any figure, by adding to the amount of equipment in use.

It is contemplated that the Bank of Italy will require three operators at the outset to administer service, over and above the great volume of business that is handled automatically. Each operator, however, will be able to supervise the entire board without moving from place to place, and a call received at a busy station will mechanically transfer itself to the operator, who can handle it most expeditiously.

The rapidity with which the bank's telephone service has grown is remarkable. The first installation in 1904 consisted of one telephone, but by 1908 a small exchange was required with two lines and eight telephones. From this simple and meager equipment, the service has steadily increased to the point where in size for this particular design, it ranks first on the Pacific Coast.

In addition to this special telephone installation, the bank will have a complete Auto-Call system. With the combined facilities which these two services offer there will be few institutions in the country more adequately provided with means of intercommunication.



Testing Out the Manually-Operated Board—The Automatic Part of the Installation in Bank of Italy, San Francisco.

Telephone in Marine Exchange Renders Valuable Service.

As a marine department of the San Francisco Examiner, the Marine Exchange at San Francisco has proved itself of invaluable service to shipping and is the recognized authority on maritime intelligence. The Marine Exchange was recently moved into a new building at Meiggs Wharf, a few miles inside the Golden Gate.

In the new station, the lookouts are permitted greater scope for sighting and reporting vessels moving in and out of the harbor and have been equipped with instruments for sighting craft and boarding ships. Acting in conjunction with the Marine Exchange lookout station at Point Lobos, where all ships are sighted off the heads, this new station at Meiggs Wharf further increases the maritime intelligence and gives to the shipping fraternity and the general public, the only maritime lookout system at San Francisco, a service surpassing any other of like character in the world.

Situated at the foot of Hyde street on the bay and elevated for extensive vision, this new station commands the inner harbor. In it is located a powerful telescope. Trained lookouts, who can identify craft by their lines and construction, are on duty night and day.

Every vessel entering through the Golden Gate is boarded by Marine Exchange representatives. The steaming time of the craft, her ports of call and manifests of her cargo are secured for shipping folk. Orders are delivered to the vessel for the owners advising the skipper where to dock.

From this lookout station, as well as from that at Point Lobos, an extensive telephone system connects with the central reporting office of the Marine Exchange in the Hearst Building in San Francisco. All information assembled is thus quickly and efficiently distributed to a wide field of subscribers. In the illustration the telephone call bell is seen fastened on the outside wall to the left of the door of the Marine Exchange.

For persons desiring to meet incoming vessels or to know of their location or arrival in the harbor, the Marine Exchange will promptly telephone as soon as the specific vessel is sighted. For this service a fee of 50 cents is charged. This telephone service is given to a long

list of shipping firms, hotels, taxi firms, and various affiliated interests as well as the public.

Government bureaus, such as the immigration, quarantine, customs, postoffice and army transport service, depend solely upon the activity of the maritime intelligence.

The Telephone Is Invaluable in Marine Exchange Work.

Vessels anchored in the stream, whether they be American or foreign, should they want a bar pilot, a river pilot, a surgeon or orders, utilize the Marine Exchange lookout station either by whistle or flag signals in the international code to secure their needs.

These messages are then sent out by the special telephone in the lookout, which is connected to a special switchboard in the Hearst Building, from where the various orders are given out.

In times of emergency or mishap it is the Maritime Exchange which first is advised, either by radio or by wire, from the many representatives along the coast from Alaska to Panama. Through its extensive telephone connections with direct lines, the marine operators on duty night and day distribute the information bringing quick and efficient relief.

Development of Loaded Circuits and Use of Repeaters.

In July, 1900, loading was first commercially applied to an aerial line 670 miles long, between New York and Pittsburgh. Loading coils having an inductance of 0.225 H, spaced 2½ miles apart, were employed. In March, 1904, the first commercial phantom circuit was completed on a non-loaded aerial line between Darlington and Boston. The circuit was 37 miles long and was phantomed on 173-lb.-per-mile conductors.

The first application of loading to phantom circuits was on an aerial line between Philadelphia and Pittsburgh, a distance of about 275 miles. This circuit was of 173-lb.-per-mile conductors and was completed in August, 1910.

Thermionic repeaters were first commercially used early in 1914 and in connection with an open-wire line of 435-lb.-per-mile conductors between New York and Chicago, a distance of 850 miles. This line was loaded with 0.25-H coils, spaced about 8 miles apart, and the repeaters were located at Pittsburgh. On July 29, 1914, Mr. Vail at New York conversed with San Francisco, a distance of 3,400 miles, over a loaded 435-lb.-per-mile line. This line was the first to use thermionic repeaters in tandem and it was opened for commercial purposes in January, 1915.

In 1895 the problem of obtaining phantom circuits on a cable was under consideration, but it was not until January, 1905, that a satisfactory duplex cable, which was designed on the "spiralled four" principle, had been evolved. At this time, however, it was considered preferable to use loaded cable rather than duplex cable, and it was not then thought practicable to load phantom cable circuits.

In May, 1900, the first loaded underground cable was put into service between Jamaica Plain, N. Y., and West Newton, and the first large commercial installation of loading on underground cables was put into service in August, 1902, when 50 pairs were loaded in a cable between New York and Newark, N. J., a distance of about 11 miles.

By August, 1911, 75 miles of the New York-Washington cable had been completed, while by June, 1912, the Philadelphia to Washington section was put into service. This cable contained 148 conductors of 166, 83 and 41 lbs. per mile, the majority of which were arranged in multiple-twin construction and balanced for phantom working.

The process of eliminating capacity unbalance which was employed on this cable was patented. These patents, which describe the process in detail, were first applied for in the United States in April, 1912.

The application of thermionic repeaters to cables was first made commercially at Philadelphia on the New York-Washington all-cable circuit. On the New York-Philadelphia section loaded 66-lb.-per-mile conductors were used, and on the Philadelphia-Washington section loaded 83-lb.-per-mile conductors were used. The total length of circuit was about 220 miles, and it was put into operation early in 1915.

Submarine Telephone Cable Laid in Ohio River by Government.

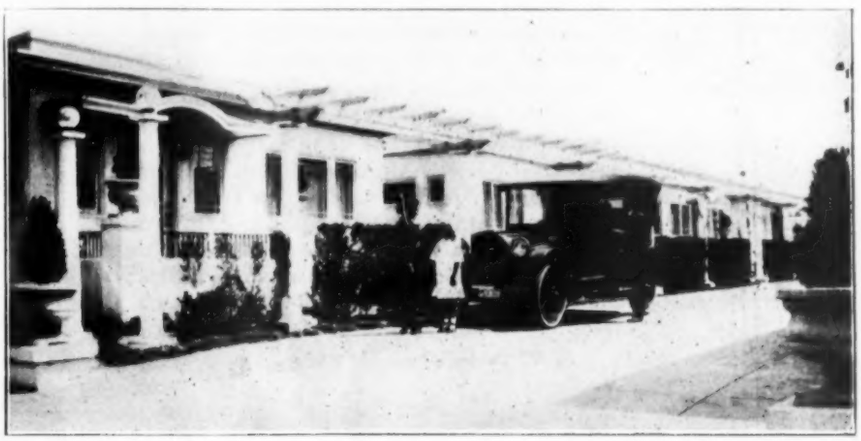
Completion of the work of laying a steel-armored submarine telephone cable across the Ohio river from the Kentucky shore to a point a half-mile below New Richmond, Ohio, has been announced by Colonel William P. Stokey, officer in charge of Cincinnati district No. 2, Corps of Engineers.

This cable is, as far as known, the first ever placed in the Ohio river. It is 2,640 feet in length and contains 25 pairs of telephone wires. The government will use 15 pairs in conjunction with the private telephone line being constructed to connect all Ohio river dams with the offices of the United States division engineer at Cincinnati, the district offices one with another.

The other 10 pairs of wires in the cable will be used by the Cincinnati & Suburban Bell Telephone Co., which shared with the government the expense of laying the cable.

Telephone Connects This Bungalow Apartment With Car Line.

The management of a California bungalow apartment has installed a telephone at the street car line, eight blocks away, where tenants of the bungalow may call up and the car—shown in the foreground of the illustration—will be dispatched for them.



The Automobile Tenant Service Depends Upon the Telephone.

The management has installed this telephone and provided the seven-passenger automobile for the exclusive benefit of the tenants who do not own automobiles. Any hour of the night or day this car is ready to transport any tenant or their friends to or from the street car line.

A Statement by the Sales Manag

(*Reprinted from the Septembe*

THIS magazine is issued by Automatic Electric Company for the information of present and prospective users of the Automatic telephone. It seems fitting that these particular columns of the publication should be used for the purpose of giving "straight from the shoulder" information concerning that part of the business of most interest to the Sales Manager —the sale of Automatic apparatus and products.

We have recently heard the statement that Automatic Electric Company is "sold up" for years ahead; that the Automatic organization is not interested in new business. While the Sales Department appreciates the compliment, it is forced to disclaim the tribute, which is, indeed, one of most doubtful value to it. We know of no surer way to discourage an intending purchaser than to tell him he cannot get the goods.

Automatic Electric Company's factory is one of the few in this country now operating on practically full time, and turning out nearly a maximum output. But it is not "sold out" years ahead; it has never claimed to be, nor, in fact, does it ever expect, or even desire, to be. It would certainly be most disadvantageous for either the present or the prospective user of the company's products, for such a condition to exist.

As all telephone men realize, immediately after the end of the war there was a rush to rehabilitate or extend plants that had been forced to go without such attentions during the war, and there was also a rush to buy new equipments for those plants that would normally have been replaced at some time during the four years of the war. The demand for subsidiary products alone, such as telephones, cords, cable, receivers and transmitters and the other odds and ends of the telephone business, was so abnormal during 1919 and 1920 that in many cases practically two years' business was packed into one year; the demand for apparatus and equipment was almost as large. Combined with these unusual demands upon most manufacturers, there existed a labor and material situation most exasperating to the manufacturer, and which contributed in no small way to the confusion of rush manufacturing and delayed deliveries that extended over a period of many months.

The situation lasted until recently—until all the really urgent and extremely "rush" demands had been met. Then naturally resulted a lessening of these abnormal "rush" orders—a situation as much to the relief of the manufacturer as the customer. This may seem a curious statement, coming from one whose business it is to sell goods, but none can realize better than a Sales Department that it cannot squeeze two months' normal business into one month and still maintain a high character of efficient, helpful service to its customers.

The Sales Department would indeed be ungrateful if it did not take this opportunity to express its appreciation of the helpful and most cordial attitude of its many customers, both old and new, during the stress of the unusual activities of the past two years. Especially is it appreciative of the patience of those older users of the Automatic, who waited with forbearance for additions to their equipment, and even in some emergencies, were so helpful as to allow further delays in their shipments in order that some new customer might sooner be introduced to the advantages of the Automatic telephone. It is not the inten-

"Automatic Telephone," a Journal of Information fo Electric Company. We aim to make it valuable to telephone service to the public, and desire to place it i already receiving it, address Automatic Electric Com

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

# of Automatic Electric Company

e of "Automatic Telephone")

tion of the Automatic organization to forget the friendliness and help shown it during these hurried months, and while, like any normal and successful manufacturing concern, it is continually on the lookout for new business, it will continue to recognize its obligations to those buyers of longer standing as well. It hopes to be able to furnish a service broad enough to encompass the needs of all.

Notwithstanding the existing financial depression, the business of Automatic Electric Company is at present normal—but a new normal, based upon the output of a factory and personnel that has been doubled, or more, within the past few years. The Automatic factory is more fortunate than many manufacturing plants in varied lines, because it is making and has to sell a product that is rapidly coming to be recognized by the whole trade in its line as the standard. We reaffirm here our belief that the Automatic telephone is the telephone of the present and the future—and we point with considerable pride to the operators and owners of Strowger Automatic exchanges throughout the world who will, we are confident, join us in that statement.

The factory of Automatic Electric Company is, as we have said, running practically to capacity, and to a capacity more than twice that of several years ago. This output is not "sold out" years ahead; the major part of it is being sold day by day, month by month, as any normal manufacturing business sells its output. It will continue to be sold that way. The telephone man who wishes to consider the Automatic telephone for his own exchanges can do so with the assurance that his equipment, when bought, will be engineered, manufactured and installed for him in practically the minimum of time justifiable for the proper completion of an undertaking of the size.

Forward-looking telephone men everywhere are taking advantage of the present lull in business to "put their house in order" for the general revival of commercial activities that is sure to come. A number of Independent exchanges are scheduled to go Automatic within the next twelve months; many present Automatic exchanges will have additions of considerable size. There is no better time than the present to consider the future, and the Sales Department of Automatic Electric Company is at the service of the telephone man who desires the facts concerning the performance, possibilities and cost of Automatic equipment.

The pioneer Automatic telephone manufacturing organization of the world is at your service. Expert and experienced engineers and manufacturing men who have for years centered their minds and energies upon the development of the Automatic telephone, and through whose experience, study and efforts it has grown to be a standard, are at your service. Automatic equipment designed, manufactured and installed by this organization is successfully rendering satisfactory and dependable telephone service in cities, towns and hamlets throughout the world, and profitably. Competent engineers will, without obligation upon your part, make the necessary traffic studies and develop the necessary facts to give you full information concerning the class and cost of equipment best fitted for your own use.

You are cordially invited to communicate with the Sales Department; prompt attention will be given all inquiries.

one Profession, is published monthly by Automatic and engineers instrusted with the task of rendering s each month with our compliments. If you are not go, Illinois

Sundry Snapshots Along the Trail

Observations and Comments, Pertinent and Otherwise, On the Sunshine and Shadows of Telephone Work

By Well Clay

I remember when I was a kid
I climbed a hill that stood
Behind my father's house a bit
Where I judged the view was good.

From which to see the world beyond
Of which I'd heard my people tell;
The waterfalls, the palace walls,
And other scenes as well.

I'd tired grown of humdrum life,
Of familiar scenes each day,
And yearned to view the queer and strange,
Which our hill hid quite away.

And so I toiled the rugged height,
Two hundred feet or more,
And slipped and fell on cruel rocks
Till my childish shins were sore.

But when at last I topped the rise
To receive a pleasant thrill,
My sole reward was to rest my eyes
On still another hill!

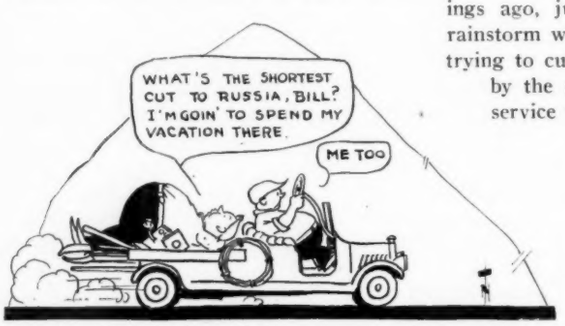
So it goes through life. When we have toiled up a great height by ceaseless endeavor, we find still another height confronting us, inviting ascent. At no place do we seem to reach a point where we can get a comprehensive view of that ever-receding mirage called Success.

New fields open up before us when we have cultivated the ones we are on, and new avenues open up before us just when we imagine we are at the end of the one on which we are traveling. New trials await us to take the place of the ones just overcome, and at all times we may be sure of a ceaseless variety to keep us from getting stale. On the other hand, there is always some sweet with the bitter and some good with the bad, else we would soon grow discouraged and quit.

One of the things which comes to vex the telephone man at times in making up the monthly balance sheet is to find that there is a disparity between the charges of different exchanges relative to messenger fees. To quote from a few remarks of my friend Wilcox of Bricelyn, Minn., who boils over with the following:

"I am busy making up last month's business, and note that a lot of the little burgs and big ones have charged from 15 to 25 cents messenger on the ones for which they had to go out to get the person called. That looks to me like an outrage, and I think TELEPHONY or the clan's attention should be called to it.

There is really not a place in the state where a nickel will not hire a small boy to go locate a person and 10 cents should cover nearly, if not all, such calls. My neighbor Frost just soaked us for 15 cents for one and I will walk around the whole darn town twice for 10 cents. For-



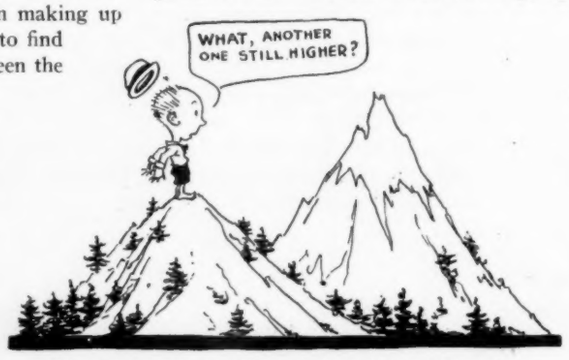
We Get Stuffed to Repletion One Day and Go Hungry the Next.

est City has one for 25 cents—another small burg.

"Another that gets my goat is this. Every once in a while some town tells us, 'We have no messenger service.' Austin swung that on us recently and we had to cancel the call. Some service I would say.

"Twenty-five cents is mounting into big money when it will buy a bushel of oats and the greater part of a bushel of corn, and to hand it out to go across the lot to get a person is not right. We get in bad easily enough in this game without adding to it unnecessarily. I know very few go after people personally. They get the neighbors to do it. I don't object to that—but make the charge decent."

Of course, there may be times when the usual charge of ten cents for a messenger does not cover the actual cost or recompense for the trouble involved in going after some one on the telephone, but in the majority of instances it will suffice. Not that there is any profit to be derived at the price for the volume of calls of this kind is extremely limited and is hardly to be taken into consideration in the income accounts.



We Find Still Another Height Confronting Us.

Sometimes a person would rather pay a dollar than go after a party wanted on the line—if it were a dark rainy night or after one has retired for the day.

I remember a case a few Sunday evenings ago, just after a heavy wind and rainstorm while we were more than busy trying to cut off permanents on the rack by the aid of a flashlight (the light service was also out of commission). A party from Minneapolis called up and was very anxious to talk with his wife, who was visiting at a friend's, to tell her not to take the morning train for home as he had changed his plans and was coming after her in the car.

Well, the friend had no telephone and party calling was not sure just what friend she was visiting that evening. We were busy and it was raining a good deal, although the storm had subsided. We undertook the delivery of the message for the usual ten cents—we surely earned it, for we did not find the lady where he said we would, which was nothing to be wondered at. Perhaps, he was not calling from his home telephone either as he said but wanted us to convey that impression to his wife.

However that call was an exception for we very often get the neighbors to do the running, as Mr. Wilcox says. It would surely be convenient to have a flat charge for messenger calls, so far as bookkeeping is concerned, but it would hardly be a profitable figure in all cases. Perhaps the average amount of trouble would make the price all right as we get a dozen where no actual messenger is required to one where we have to hoof it.

As I said before, we have to take the bitter with the sweet, which reminds me of an experience recently while patroling rural lines. As you all know, in patroling lines one loads his automobile with everything liable to be needed and goes along the lines putting everything in shape. Every little ways, one comes to a patron's loop and this is also gone over; the trees trimmed, batteries tested, drop inspected, loose wires tightened, generator oiled and everything put in apple-pie order.

It is the custom among our rural friends in these days when long hours of work are necessary in the fields or about the threshing yard to pause in their labors in the middle of the forenoon and likewise afternoon to partake of a lunch; which the good "housfrau" brings out.

On this particular afternoon we started

out to patrol, after having partaken of a hearty dinner which made us feel at peace with all the world. Along about three o'clock we drove into a yard where the farmer was gathered with his family and hired men, taking their afternoon's lunch of coffee, bread or sandwiches, sausage and cake.

They asked us to join them and we did so reluctantly—not on account of the quality of the food, which was fine, but from the still-present recollections of the big dinner we were transporting. However we "joined in," which means two cups of coffee, a couple of sandwiches and at least one piece of cake; because it is not good form in this region to refuse to take lunch when invited, even if one is a stranger, and we were anything but that.

As we drove away after giving thanks to the host and hostess, we had forgotten Russia entirely. Our next stop half a mile away landed us in the middle of a threshing crew "taking lunch" and they yelled for us to "dip in." This time it was coffee, ham sandwiches, doughnuts and cake. We "got by" as best we could and beat it to the next place, with the good fortune to join a good Danish couple in their lunch of grape juice, cookies and a piece of pie.

They did not talk much English, and we were afraid to try to explain the situation in our limited supply of Danish, so we sat in and did our best. Well, all we had to eat after that before supper was one lunch which a good Bohemian lady made us take because we had stopped and helped her get the cows out of the corn and the fence fixed, after we had got her telephone working. She gave us "Colaches" ginger-bread, cake and coffee and tried to have us try one of her raised doughnuts—but we surrendered and quit as there were only two of us and we couldn't stand the strain.

With fear and trembling we entered the farmyard of the next patron who was of a religious belief which believes in keeping Saturday—that being the day—but were overjoyed to find no welcoming lunch spread out to add to our already overstuffed stomachs. In fact, they were fasting and we gladly joined them in that enterprise.

So as I said before, we get stuffed to repletion one day and go hungry the next—all of which adds to the zest of the game. At this time of the year, which is the best time to work on rural lines, one can always have offered him all the fruit, melons or good things in that line he cares to sample. With all our boasted civilization and efficiency of management, half the fruits which grow, go to waste unpicked, to rot on the ground for lack of time to gather for the price at the primary markets, if their sale is sought.

APHORISM: Too much is sometimes more than enough.

Program for Convention of Indiana Telephone Association.

The program for the annual convention of the Indiana Telephone Association to be held at Hotel Severin, Indianapolis, September 13 and 14, has been completed, and it should attract many to the meeting. A wide variety of topics will be discussed and every Indiana telephone man will undoubtedly obtain the answer to his own particular problem in the addresses.

Service—that quantity so necessary to the success of all public utilities—will be the keynote of the meeting. The two-day affair, according to Max Hosea, treasurer of the association, will be in the nature of a "get-together-for service" meeting.

The complete program is as follows:

TUESDAY MORNING, SEPTEMBER 13, 9:30

Registration, 12th floor, Hotel Severin.

"Address of Welcome," Warren T. McCray, Governor of Indiana.

"Response to Welcome," Henry A. Barnhart, Rochester, President, Indiana Telephone Association.

"Government," Commissioner Geo. M. Barnard, Indiana Public Service Commission, Indianapolis.

Reading of minutes of previous meeting.

Reports of officers.

AFTERNOON, 2 P. M.

Address, F. B. MacKinnon, Washington, D. C., President, United States Independent Telephone Association.

Address, J. G. Brown, Indianapolis, President, Indiana Federation of Farmers' Associations.

Report of Activities and Addresses by District Associations.

"History of Northern Indiana Telephone Association," F. V. Newman, Laporte, President, Northern Indiana Telephone Association.

"History and Workings of Benton Telephone Association," L. W. Conarroe, Brookston, President, Prairie Telephone Co.

"Lest We Forget," W. L. Bott, Rensselaer, President, Jasper County Telephone Co.

"Depreciation," A. L. Stauderman, Terre Haute, Secretary and Engineer, Citizens Independent Telephone Co.

"Public Relations," S. M. Isom, Mitchell, President, Southern Indiana Telephone Association.

"The Future of the Telephone Business," L. C. Griffitts, Seymour, Secretary and Treasurer, Southern Indiana Telephone Association.

EVENING.

Dinner, Severin Roof Garden.

Dancing after 9 p. m.

WEDNESDAY MORNING, 10:30 O'CLOCK.

"Taxation of Public Utilities," Nelson K. Todd, Indianapolis, Tax expert, Indiana State Board of Tax Commissioners.

"Interpretation of Labor Laws, Affecting Telephone Companies," Mrs. A. T. Cox, Indianapolis, Director Department of Women and Children, Indiana Industrial Board.

Address, Samuel R. Artman, Indianapolis, Chairman, Industrial Board of Indiana.

Election of directors for ensuing year.

Reports of committees.

WEDNESDAY AFTERNOON, 2 O'CLOCK.

Address, Lawrence E. Lyons, Indianapolis, Director, State Highway Commission.

"Origin and Development of District, State and National Associations, A. C. Lindemuth, Richmond, ex-President, National Independent Telephone Association.

"Problem of High Tension Lines Built Along and Into Telephone Leads by Electric Light and Power Companies," P. J. Maloney, Columbia City, President, Northeastern Indiana Telephone Association.

Address, Frank E. Bohn, Fort Wayne, Secretary and General Manager, Home Telephone & Telegraph Co.

Growth of Telephone Traffic in Los Angeles in Two Years.

An outline of the tremendous growth of telephone traffic in Los Angeles, Calif. during the past two and one-half years was set forth recently by N. R. Powley, commercial superintendent of the Southern California Telephone Co., of that city.

In commenting on the extensive building program upon which the company recently entered and will enter, due to the heavy demand for new telephone connections as a result of the rapid growth of the city, Mr. Powley said in part:

"Two years ago there were connected to the main office on Hill street 14,000 telephones. Every foot of available space in the office at Hill street is now used by equipment. The traffic became so heavy from these 14,000 telephones that it was necessary to transfer 5,000 of them to the Olive street office so as to permit the efficient handling of the service of the remainder of 9,000 telephones.

"The remarkable part about the increased traffic is that these 9,000 telephones, due to the high calling rate per telephone, took every section of switchboard which had been previously installed to handle 14,000 telephones.

"Telephone traffic in Los Angeles today is the highest in the history of the company, and that is the result of not only a remarkable business activity but of a most phenomenal growth.

"Since the armistice the company has installed in Los Angeles upwards of 85,000 telephones, or a number equal to over one-half of the number of telephones that there is now in service, namely, 155,000.

What Is Your Company Doing?

Chats About Company's Doings.

By Stanley R. Edwards.

D. C. Phillips, president of the Citizens Telephone Co., Marengo, Iowa, believes that everyone who uses the telephone service should be a subscriber. He had some who used the service but were not subscribers, so he ascertained the names of several men who followed the practice of using their neighbor's telephone. Then he had the operators keep track of the number of times these persons "borrowed" the service. At the end of the month, a bill was sent each one for so many calls at five cents a call.

"There was immediate response to these bills," says Mr. Phillips in telling about it. "The first one to call at the office was a minister and he brought the money to pay the bill. He apologized for using the service without paying for it, but I told him that I didn't want his money—that I wanted him to be a subscriber. He saw the point, and signed up then and there.

"There were four others," continued Mr. Phillips, "and I had some lively settos. One man insisted on paying the bill but vowed that he would never again use the service and went away real mad. Two of the others saw the point when I told them I did not want their money but wanted them as subscribers, and signed up for service. Another one refused to pay at all, so that I scored three out of a possible five."

Out in the white pine forests of Northern Idaho, the telephone wire is suspended from trees on split-tree insulators. The lineman shown in the illustration, with his safety strap at full length, is replacing the broken "hickeys" on a 48-mile line from Orafino, Idaho to Elk River.

Pole Line Replacement in the Mountains is Difficult—But How Would You Like to Summer in Them?

In some parts of the Clearwater country, pole-line replacement is difficult. The illustration shows that these are real hills and makes the city man envy the lineman who during the summer has an opportunity to spend a good deal of his time amid such surroundings.

The Southern Bell Telephone & Telegraph Co. and the employes of its Tifton, Ga., exchange, headed by Manager R. C. Seaman, recently were hosts to about 500 visitors at a reception in the company's new home. The new exchange, located at the corner of Fourth street and Hargrett lane, was completed at a cost of $70,000, and the new common battery system was placed in use July 1.

The civics committee of the Twentieth Century Library Club had the affair in charge. There were refreshments and favors for all visitors, who were shown through the up-to-date plant. After the reception, which lasted from 5 to 9, a dance was given for the force and their friends. A number of out-of-town people attended the reception.

One of the Kansas City papers recently published an editorial which shows why the farmer must have the telephone. Here it is:

"Farmers in the neighborhood of Baldwin, Kas., are reported to be rebelling against an increase in telephone rates recently authorized for the Baldwin exchange by the public utilities commission. About 40 farmers have ordered their telephones taken out, and there is talk of establishing an independent farmers' exchange.

A farmer can't get along without a telephone for any great length of time, and it is probable that when the farmer's wife has occasion to conduct negotiations with the Baldwin grocer concerning the price of eggs for the following Saturday, her husband will receive some advice. Utilities commission or no utilities commission, those farmers will have telephones.

The telephone has done much to improve life on the farm. Along with the cream separator, the tractor and the automobile, it has been instrumental in making the American farm the most scientific and modern in the world.

It was not many years ago when it was necessary to drive over to the neighbors to get somebody to help butcher the next day. When the doctor was needed, one of the boys had to hitch up and drive all the way to town. This is all changed now, and when an extra hand or medical assistance is needed, it is only necessary to take down the telephone receiver.

So whatever action the farmers may decide upon regarding the increase in rates, it's a pretty safe conclusion that they will establish telephone communication somehow. It's entirely too much trouble to drive all the way to town just to order a new part for the binder."

The Lineman Finds Much Work in the White Pine Forests of Idaho.

"Speaking of service!" exclaimed the traveling man as he stood in front of one of the telephone booths in the Pennsylvania Station, in New York City, "and consideration of the public. You'd never get that anywhere except in New York."

"Well," grinned a guard who was standing by, "we strive to please, so when we found that some folks were too short to reach the telephones if they were high, and others had to almost bend double to talk over them if they were low, we decided we'd have 'em arranged accordingly. So we have some for the tall guys and some for the little dolls, and a few that both can use as they're got stools before them to sit on."

A recent statement by Horace M. Davis, director of the Nebraska Committee on Public Utility Information, Lincoln, Nebr., indicates that the Nebraska committee is probably obtaining a larger proportion of space in the country newspapers than many other similar bureaus.

Out of 488 newspapers in Nebraska, only 12 have offered unfavorable criticism on the operation of the Nebraska Committee on Public Utility Information and at least 366 have used some of the matter from time to time. A progres-

sive, little, daily paper, which is printed in a town where everything is municipally owned recently devoted more than half of its front page to matter sent out by the committee.

"There is an unmistakable trend toward a more favorable public sentiment to the utilities generally," said Mr. Davis, "and while this bureau does not claim all of the credit, it does modestly claim to have had a hand in bringing the utilities' problems direct to the people who are interested, and by going at it at the grass roots generally; namely, through the country press."

The Citizens Telephone Co., of New Castle, Pa., has eliminated its collectors and now allows a 10 per cent discount on bills paid by the tenth of the month. In announcing the change in collection methods, G. D. Dennis, general manager of the company, sent out a circular letter, reading:

"It is the desire of this company to furnish the public with the best service possible for any telephone company to give at the most economical rate.

With this object in view, we are discontinuing our collector who has been calling on you each month to collect the accounts, and are going to offer the subscribers the benefit of this saving by allowing them a discount of 10 per cent on all accounts paid at the office, or by check on or before the 10th of the month in which the bill is issued.

We hope you will appreciate our position in this matter, and realize that we are trying to keep abreast the times by decreasing in every way the high cost of all things that are a necessity as well as a convenience to the public.

The present company has only in mind serving the people with the very best telephone service possible. In the near future, we hope to have it one of the enterprises that the people will be proud to name as a local organization; owned by themselves and the merchants with whom they do business every day; and any profits derived from its operation will be left right in New Castle.

In order to do this we are going to ask if you will furnish us with the names of the persons or firms whom you have occasion to call. The company will have a representative call on them with the object in view of connecting them with our system, and in that way increase the value of your service to you. Or if you will have your friends or business associates make application through you for telephone service, on installation of the telephone, we will credit your account with one month's telephone rent; or if you would prefer it, we will give you the equivalent of one month's rent in cash.

We hope that each and every subscriber will avail themselves of this opportunity, and in this way both yourselves and the telephone company will be benefited.

We would be pleased to have any or all of our subscribers call our attention to any apparent irregularity or fault that will help make the service what you desire.

There have been arrangements made with the Western Union Telegraph Co., whereby the subscribers of the telephone company can send telegrams from their telephone and have them charged and collected by the telephone company on your regular monthly statement, thereby saving you a trip to the telegraph office.

One of the most regrettable things between the people and the telephone company is the fact that they have not been on more friendly terms, and in this way a condition was brought about that proved disastrous to the people as well as the telephone company.

We expect to do our part to avoid such a condition in the future and ask that the public will do their part also and help along a cause for the good of the community in general.

We extend an invitation to the public as well as the subscribers to visit the exchange and get acquainted with the switchboard over which you are getting service and also be convinced that our position is for your good and to make things better for you and your city. Such an enterprise should have the support of the people.

Yours for better and more extensive telephone service."

A very unique method of bringing about the merger of two companies was employed in the recent merger of the Litchfield Farmers' Mutual Telephone Co. and the Michigan State Telephone Co. exchanges at Litchfield, Mich., according to the Independent company's operating manager, Clyde Anthony.

It seems that for a number of years the community had been trying to get the two telephone companies to consolidate but no progress was made. Mr. Anthony's wife became manager of the Bell company, which at one time served between 400 and 500 subscribers, but was run down due to high rates so that it only served 75 subscribers.

The two exchanges being next door to each other, Mr. Anthony had a doorway made between the two offices and ran both night shifts. He acted as mediator between the companies and in June was able to get them together. In one evening the companies agreed on a price and the bill of sale was signed by the state utilities commission on July 1.

The Mutual company purchased the Bell's complete plant, excepting the switchboard and office fixtures, through toll lines, and toll line poles. Included in the purchase was the Bell's main frame distributing rack, cable, village lines, country lines, and one toll line. The cut over to the Mutual's board took place on July 9. Four years ago the Michigan State company cabled and rebuilt the plant at an expense of nearly $7,000, making it one of the best equipped offices in the state.

"We now have an exchange of nearly 450 stations," writes Mr. Anthony, "and expect to reach 500 by the first of the year. After many years' efforts and expense, we now have one company in our village of 750. We have rural lines now sufficient to take care of all prospects within a radius of many miles and can now accommodate from 750 to 1,000 stations with our system. The Bell company came more than half way in the negotiations. Every part of the transaction has moved smoothly."

An interesting review of the local telephone business in Fort Wayne, Ind., from the installation of the first plant through the period of development and up to the present time, was given by E. L. Gaines, of the Home Telephone & Telegraph Co. at a recent noon luncheon of the Kiwanis club.

Mr. Gaines said that the telephone rates in Fort Wayne are lower than in any other city in the United States, and that it is necessary for the company to be granted a better rate in order that it may be able to attract the capital with which to make the extensions required to take care of the future needs of the local service.

Getting the public acquainted with the telephone business is one of the jobs of company officials—and no better way can be found than informal talks before various business organizations.

Personality always counts and produces a favorable impression—even upon the opposing side in a rate case. An instance of this occurred at a recent hearing in the Pacific Telephone & Telegraph Co. case at Portland, Ore.

Major C. O. Bickelhaupt, commercial problem engineer of the American Telephone & Telegraph Co. was a witness for the telephone company. Major Bickelhaupt was straightforward in all his answers under cross-examination and both attorneys opposing the rate increase declared that he was the fairest witness the company had put on the stand.

"I am willing to recommend that the American company double Mr. Bickelhaupt's present salary and send him to Oregon with a free hand to operate the telephone business in this state. I am convinced that if this were done, we would get along fine," one of the attorneys stated.

The other attorney joined in commending the witness, requesting the commission to require his continued attendance at the hearing until it was concluded.

The Efficiency of Cable Multiples

Conditions Affecting the Multiplying in the Outside Cable Plant—Methods of Cable Relief—Uses of the Multiple Scheme in Distributing Cables and Terminals Discussed in a Recent Issue of Bell Telephone News

By J. P. Kobrock

In the early days of the telephone, all circuits were carried as open wire on crossarms. As the telephones increased in number, a substitute for the large amount of open wire was evolved in the form of cables, Fig. 1. These cables were placed to carry the longer lines, while the short lines were carried as open wires direct from the office.

Each cable was terminated in a terminals, and a cable provided for each terterminal. Later, instead of placing a cable for each terminal a greater number of pairs were placed in the cable and where the cable changed in size, the ending pairs were terminated in a terminal. This still necessitated paralleling cable with open wire for distributing purposes. Then to avoid this, intermediate terminals of smaller size were placed, but the cable pairs still terminated only once.

It was found that unavoidable irregularities in the distribution and inaccuracies in the estimate of expected business did not permit of an efficient use of the cable if the pairs were brought out at the terminals but once. From this deficiency developed the system of multiple distribution, or the same pairs appearing at more than one place. By this is meant the determination of the terminals and cables in which the same pairs shall appear.

At various times the groups of pairs assigned to each terminal or cable has been called the multiple, count, cut-out, complement, pair assignment or bridging of that terminal or cable. In this paper, the term "multiple" will be used. The system of multiples must be so arranged that no terminal will be congested, while in others there will be idle or spare pairs that might be used at some other point. The system of multiples also affords an opportunity of economically forming party-line groups by bridging the stations on the same pair at the different terminals.

From these statements it is seen that the primary motive in multipling the pairs is to secure a full and efficient use of the cable plant. A corrollary to this motive is the flexibility of the cables and ease and economy of handling new and existing telephone service. Therefore, it is necessary to so plan the multipling that the cables will take care of the load for the longest time with the fewest changes. A cable when once installed, should be disturbed as little as possible, for future changes in multiples are not only expensive, but also injurious to the cable.

At one time the cable load or fill—i. e., percentage of cable pairs in use—was not allowed to exceed 75 to 80 per cent. With a proper system of multiples, there is no reason why the working pairs in the feeder cables should not reach 95 per

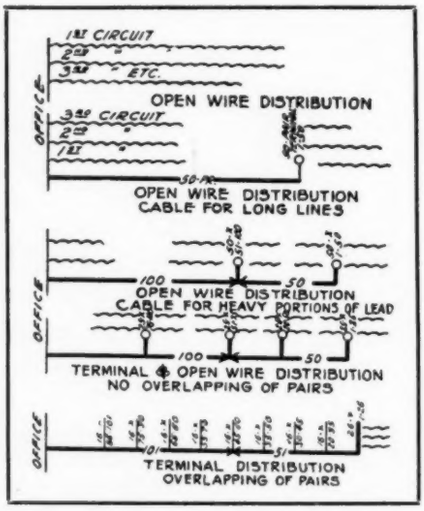


Fig.1. Development of Cable Plant and Multiples.

cent or even 100 per cent at the time relief is actually provided.

The greater portion of the expense of the cable plant is in the main or feeder cables. Hence, feeder cables should be provided only in such amounts as to keep a reasonable margin of facilities above the actual requirements; yet there must be available at all times suitable cable facilities to take care of any new subscribers.

However, if a pair of wires are provided for each prospective subscriber, an excessive amount of idle plant would be required and large sums of money would be invested in feeder cables that would not be placed in service and become revenue producing for a long time. Hence, a system of multipling is to provide reasonable cable facilities at minimum expense. The multipling system must, therefore, also readily adapt itself to changing business conditions.

Facts Affecting the Multiples.

No definite rule can be outlined as to the methods of multipling cables. Each cable should be studied and an arrangement of multiples obtained that will require little or no changing in the future. Certain conditions affecting the multipling, require consideration in order to insure the required fiexibility of the cable system. They are:

1. *Growth*: The estimated growth over a large area can be more accurately forecast than it can for a small area. Accordingly pairs are provided in the main cables feeding large areas to care for the prospective growth and are terminated in a number of distributing terminals. Regardless of any local irregularities of growth, the multiples of the terminals should be such that facilities for new business exist from time to time in all portions of the cable.

2. *Class of Service*: The actual multipling must always be such as to meet the class of service in the district served by the cable. When multipling for party-line stations, pairs should appear in common in various terminals; for special line service, common pairs are not necessary, although all pairs should appear at more than one terminal to secure the desired flexibility. As far as possible, the multiples should be planned so that a minimum amount of party-line regrouping with consequent number changing is necessary when the cable is cut for relief.

3. *Financial Considerations*: The most economical arrangement of any plant is reached when the aggregate annual charge is a minimum. Sometimes cases arise where this engineering viewpoint must be modified to meet the financial viewpoint. Nearly always this reduces the number of years for which the construction is planned, i. e., results in the placing of a smaller cable. This results in a greater overlapping of pairs and perhaps changing the method of relief.

4. *Terminals*: The proper planning of multiples involves the question of the frequency of the cable terminals. It is usually economical to provide one or more terminals per block. It must be remembered that the number of terminals in a block depends on the relative annual costs of terminals and distributing wire, and not on the number of pairs in the cable or any particular scheme of multipling.

5. *Methods of Relief*: In arranging the system of multipling, definite future points of relief should be established so the necessary relief can be properly provided when needed. After the cable is cut for relief, all the pairs should appear at terminals in each portion without a further rearrangement of the cable. A few of the many methods of relief

will now be considered to show how the multiple is affected.

Both aerial and underground feeder cable facilities are provided only for a reasonable margin of growth above actual demands of the business at the time of installation. If this is not adhered to, an investment is made that does not become a revenue producer for a long time. In planning these cables, their sizes are determined by a study of the aggregate annual costs.

The annual cost must take into consideration the cost of cable transfers and subscriber number changes at time relief cables are placed. When the cable involved is small, the cost of this part of the relief work often forms a large part of the expenditure, thus making it inadvisable to plan cable to require frequent relief. On the other hand, where the cable involved is large, and the extra cost of later relief may be negligible, the idle investment may be heavy, thus permitting the cable to be economically relieved at frequent intervals.

After determining the size of the feeder cable, it should be extended as a straight cable to feed as large a territory temporarily as possible; the cable is diminished only at the extreme end. When the first cable is planned, it should be so laid out as to conform to the future relief move. Relief can then be had easily and cheaply by placing the feeder of second importance. This is continued as telephone growth is secured. Perhaps this is better illustrated by Fig. 2, showing a feeder cable with its distributing cables in one section of a central office district.

The sizes of the distributing cables are determined by the area they will feed ultimately, making allowance for each ultimate subscriber. A proper design would provide for both feeder and distributing cables becoming congested at the same time. A relief cable would then be placed as shown in Fig. 3. The same plan would

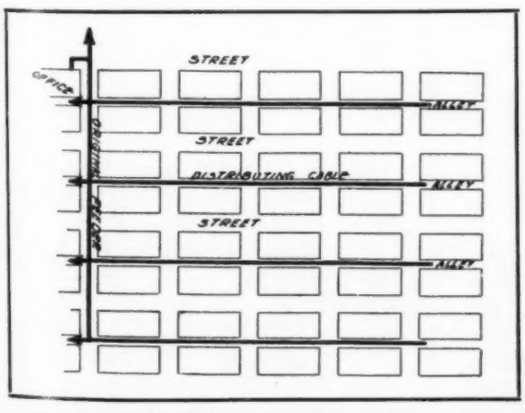


Fig. 2. Feeder Cable with Distributing Cables.

be followed for additional relief in the future.

This ideal method of relieving congested cables is subject to great variations in actual practice due to:

1. Right of way difficulties on private property.
2. Nature of blocks, such at "T" alleys.
3. City requirements.
4. Topography of territory.
5. Irregular growth.
6. Existing plant on all feeder routes.

A frequent method of underground relief is that which parallels the existing cable from the office to the point of relief. The relief cable takes from the original cable that portion of the load beyond the point of relief. This leaves the original cable to carry the load between the office and point of relief, leaving a large amount of dead wire in the original cable. This is shown in Fig. 4 at *A* and *B*. This method has the advantage of requiring a minimum number of cable transfers.

By the method shown in Fig. 4 at *A*

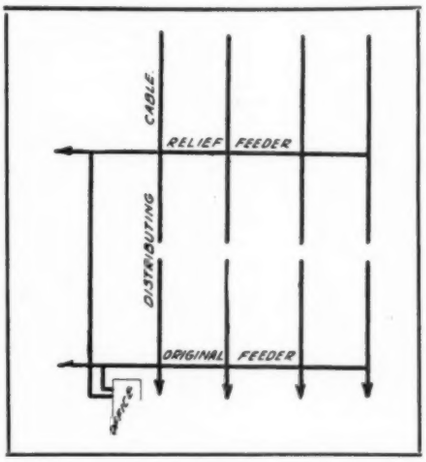


Fig. 3. Typical Method of Relief.

and *C*, the branches on the cable to be relieved are transferred to the new cable paralleling the existing cable. This method requires a large number of cable transfers. On the other hand, with this method the amount of wire is more in proportion to the load than in the method just described. This method is adapted to providing relief on a piecemeal basis.

In many plants the aerial feeder cables have been tapered —that is, reduced in size as the needs decreased towards the end of the cable. This reduces the amount of dead wire in cable. Cables should not be tapered except at the extreme end because:

1. Relief is usually more expensive.
2. Reduction in initial investment is small due to added labor cost of handling extra reels and small price differentials in adjacent sizes of cables.
3. Errors in estimating future growth.

As mentioned, in order to use the feeder cable to the greatest efficiency, it is necessary to have it feed temporarily as large an area as possible. Hence, it is the practice in multipling to bring out all the pairs as soon as possible and to bring out all the pairs as often as possible.

It should be mentioned that there is an electrical limit to the number of times

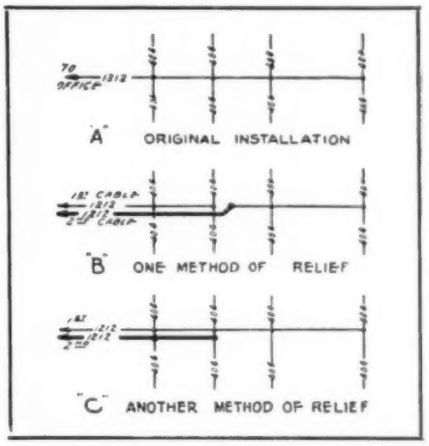


Fig. 4. Methods of Underground Cable Relief.

that a cable pair can be multipled. Each pair of binding posts lowers the insulation resistance an appreciable extent. The maximum number of times the pair appears depends entirely on the operating conditions in the plant.

The point of relief would be where the whole cable is brought out the first time. At diminishing points, the permanent branches should be spliced to the pairs that terminate at that point. Two branches from the feeder cable at the same point should not take the same multiple; preferably these branches should be multipled with branches at a distant point. When it is necessary to multiple solid connecting cables—that is, with no cross-connecting terminals—the multiple should be such that terminals on each will overlap with two terminals of the other cable.

After a permanent underground cable is placed, it is not only expensive but considerable damages may be done in case it is again opened for any reason. This damage would consist of low insulation and defective pairs. Hence, it is customary to take a short branch out of the main cable into the manhole. This short branch, called a stub, is usually larger in size than the branch cable leaving the manhole. Without opening the main cable after being spliced, the stub accomplishes:

1. Change in multiple of branch cables.
2. Addition of new branch cable.
3. Addition of a larger branch.
4. Removal of temporary branches when main cable needs relief.

The multipling of stubs is handled similarly to the multipling of the branch cables. In both cases it is necessary to consider the proposed methods of future relief and evolve a foolproof scheme

of multiples requiring no changes in the future.

Temporary terminals spliced to stubs should be partially multipled to two or more permanent terminals. Hence, it is

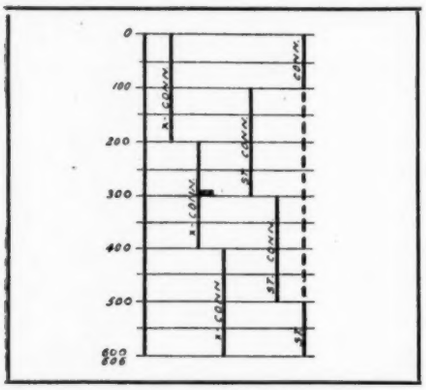


Fig. 5. Example of Multiples of Straight and Cross-Connecting Branches on an Underground Cable.

advisable to have these stubs multipled with pairs terminated at two or more permanent stubs. Where possible a straight connected cable or terminal either block or aerial, should be multipled with a cross-connecting terminal or an underground terminal feeding only open or drop wire. Fig. 5 shows cross-connecting terminals bridged with straight connecting terminals.

Multipling Distributing Cables.

The same plan of multiples illustrated in Fig. 5 may be applied to distributing cables, bearing in mind that the branch cables correspond to the terminals and that the pairs should appear in the same general way. This is perhaps better illustrated in Fig. 6.

As shown, the distributing cables should always be multipled with the pairs in rotation and brought out as soon as possible. In this way points of relief are definitely fixed. The cable may then be cut and the outer end connected to the relief cable without requiring multiple changes. In the figure, the distributing cables are assumed as 50 pairs; for smaller branches two or more may be grouped together as a unit.

In multipling one branch with another, although there may be sufficient spares in the multiple to accommodate the working pairs in the branches, care should be taken that the individual terminals on each cable will be so arranged that the combined working lines in two or more terminals will not be in excess of the pairs available. Of course, due allowance should also be made for future growth.

Changes of the multiples of distributing cables should seldom be necessary on account of irregular growth. However, a close adherence to any system of multiples will not eliminate this entirely.

The character of the district fed determines the number and location of the terminals. The number depends on the relative annual cost of terminals and distributing wire. It should be understood that the number of lines to be handled determines the size of the cable, while the number of drops to be handled determines the size and number of terminals provided. This distinction is due to party-line distribution.

Multipling Distributing Terminals.

Larger terminals than required for the number of drops to be handled are used in order to secure flexibility. This allows the multiple of adjacent terminals to overlap, thus allowing spare pairs to be available in any portion of the branch cable.

In multipling the terminals, it should be remembered that it seldom proves economical to cut-in intermediate terminals at a future time rather than provide the ultimate terminal capacity at the time of placing cable. This is due to the labor cost in cutting-in terminals on working cable being three to five times that on dead cable.

In laying out aerial or block cables, usually a certain portion of the cable

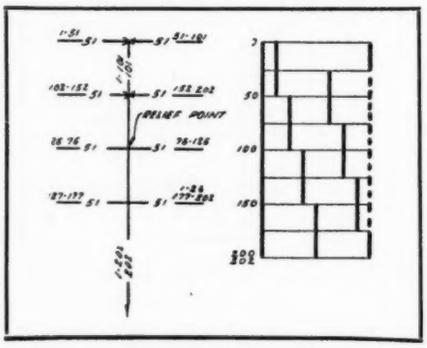


Fig. 6. Example of Distributing Cable Multiple.

is reserved to ultimately feed a certain territory. In these cases, the multiples should be so arranged that each ultimate section can be considered as a unit by itself. The terminals would be spliced permanently and the multiples seldom disturbed.

The multiples for distributing cables are laid out on the assumption that the cable is large enough to care for the ultimate lines. If it is intended to relieve the branch cable, the terminals beyond the point of relief should be multipled according to the scheme for that number of terminals. Of course, this process is repeated in the balance of the cable back towards the central office. The primary idea in the multiples of the terminals is to be able to transfer working lines and to prevent idle pairs remaining dead because unavailable at the terminals where they might be used.

In small exchanges with special-line service only, the overlapping of the multiples is not so important. In such cases it is desirable that all pairs appear at least twice in different terminals. To efficiently care for two-party service, common pairs should appear at least three times in adjacent terminals. For four-party service, it is advisable to have common pairs appear more frequently in order to obtain the most economical use of the cable plant. Often it is difficult to determine to what extent party-line growth will be taken.

Fig. 7 illustrates typical multiples of various numbers of terminals on branch cables. The same illustrations are modified in practice to meet the local conditions or to provide for terminals of another size. A glance at the illustrations shows that certain pairs are brought out often, making provision for party lines. At the same time for maintenance reasons, this plan of multiples insures that the terminals at which party lines will be made up are not widely separated. Other pairs appearing less frequently are used for special-line service.

At one time it was thought desirable, in order to secure more flexibility, to break up the terminal multiple into two or more groups of consecutive pairs. These were called "split counts."

Inasmuch as the multiple system is only a relative arrangement of pairs in each terminal to the pairs in the other terminals, it is obvious that nothing is gained by the "split count." This can very readily be shown graphically. Hence, in order to preserve the system of multiples as simple as possible and in order to facilitate its operation and maintenance, the pairs in each terminal should appear in consecutive order.

In order to meet their guarantees, the manufacturers provide one extra pair for each 100 pairs or fraction, in the cable. In all cases, the extra pairs provided should be terminated on the main distributing frame, and in various terminals so as to be available for use.

In connection with the installation of

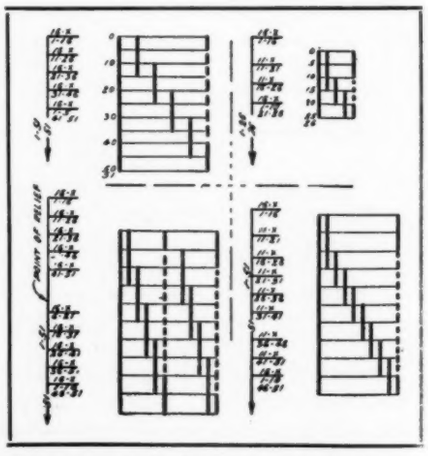


Fig. 7. Typical Cases of Terminal Multiples.

house cables, the cross-connecting terminal should be designed as small as possible; in cases of small cables all pairs are terminated in the terminal. The mul-

tiple in the larger cables is so distributed that in each distributing terminal there appear pairs direct to the central office and also pairs direct to the cross-connecting terminal.

Sometimes it is desirable to place new

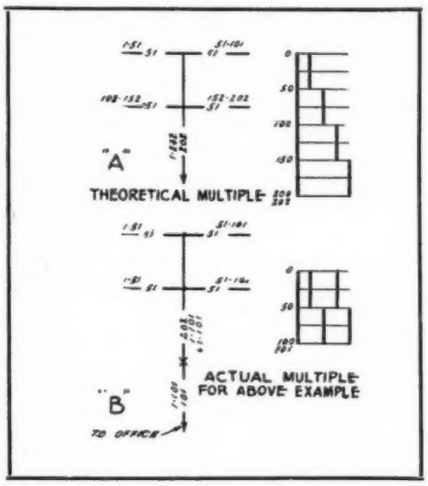


Fig. 8. Multiple Based on Size of Cable.

cables in making extension that are larger than the feeder cables. In those cases where a cable is temporarily spliced to a smaller cable, future transfers can be avoided by multipling the cable on the basis of its actual size and then connecting two or three pairs of the new cable to one pair of the extising or temporary cable. The multiple based on size of cable is termed the temporary or theoretical multiple. This is illustrated in Fig. 8.

On trunk cables, it is desirable to avoid using unnecessarily central office terminal facilities and to eliminate the extra service interruptions and expense of running and maintaining jumpers on the distributing frames. Hence, trunk cable multiples should be so arranged that trunks between certain offices take direct pairs. The number of pairs between each group of offices depends upon the traffic requirements, the size of the trunk cable and the splicing details.

In concluding, it should be remembered that no scheme of multiples can be followed literally but that experience, good judgment and common sense based on a knowledge of local conditions must enter into a practical solution of each specific problem.

Road Building and Telephone Automobile Dispatching.

The construction of two long stretches of reinforced concrete roadway by the Massachusetts Department of Public Works, Division of Highways, between Palmer and Worcester presented a problem which the telephone solved to the complete satisfaction of all, says Telephone Topics.

The first stretch of 1½ miles is located just east of Palmer, the second of two miles immediately west of the junction of the highway to North Brookfield with the Worcester-Springfield road. Neither stretch was so located as to offer any practical detour.

The contractors are building one side of the road at a time and traffic goes through single file in one direction at a time. Control of this traffic by the usual system of wigwagging was deemed unsatisfactory and conducive to argument and delay on account of the distances involved.

Solution: A private telephone line leased from the New England Telephone & Telegraph Co.

Result: As found by a study made by engineers from the highway departments of other states, the result during the daytime traffic was an average wait of 12 minutes per car, with an average number of cars passing through at each "installment" of 28.

Biographical and Personal Notes

Ira S. Weiss has been elected secretary and treasurer of the Keystone Telephone Co., of Philadelphia, succeeding the late E. F. Reeves. Mr. Weiss has been assistant secretary and treasurer of the company.

John P. Boylan, general manager of the Malone exchange of the Mountain Home Telephone Co., of Plattsburg, N. Y., since the consolidation of the Bell and Independent telephone interests in that district following 1912, has resigned to accept the vice-presidency and general managership of the Rochester Telephone Corp., of Rochester. He began his new duties August 15.

Percy Hammond, general traffic superintendent of the Southwestern Bell Telephone Co. in Texas, has been appointed general manager of the company for Missouri and Arkansas, succeeding W. G. Barry, who has joined the organization of the Ohio Bell Telephone Co., with headquarters in Cleveland, Ohio.

Mr. Redmund started his telephone career as a clerk for the Western Electric Co. in 1894. The following year he was transferred to the American Telephone & Telegraph Co. where he served as chief clerk, manager, and superintendent of traffic.

In 1910, Mr. Redmund went with the Pioneer Telephone & Telegraph Co. as general superintendent of traffic with headquarters in Oklahoma City. In 1914 he was appointed general traffic superintendent for the Southwestern Bell company in Texas. He assumed the duties of general manager with headquarters in St. Louis, on the first of last month.

The Late W. P. Hawley Was Active Head of Bluefield Telephone Co., Bluefield, W. V., for More Than 25 Years.

Obituary.

W. P. Hawley, founder of the Bluefield Telephone Co., of Bluefield, West Va., and for more than 25 years its active head, died on August 6, after an illness of several weeks' duration.

West Virginia is Mr. Hawley's native state. He was born in Beckley, a city of about 2,000 population, on July 22, 1868, and graduated from the state Normal School at Athens, W. Va.

In addition to being general manager and secretary and treasurer of the Bluefield company, Mr. Hawley operated one of the largest department stores in the city of Bluefield. He was in the mercantile business for over 30 years.

Through Mr. Hawley's constructive and capable management, the Bluefield company has grown from 34 telephones, which it operated in 1896 when he assumed managership, until it now operates over 5,000 stations. His aim was to give good service and make profits and that he was successful is evidenced by the fact that he had a satisfied community and stockholders who do not sell their stock.

The deceased was prominent in political and fraternal circles in Bluefield, being a member of the Masonic fraternity and Elks. His work for his community stands as an endless record of his exceptional public spirit and civic pride.

Commissions, Courts and Councils

Discussion and Rulings of State Bodies Having Supervision Over Telephone Companies—Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchise, Rates and Service

Ohio Consolidation Now Before State and Federal Commissions.

Following the adoption, August 22, by stockholders of the Ohio State Telephone Co. and the Ohio Bell Telephone Co. of the agreement of consolidation previously entered into by the directors of the two companies, petitions for approval of the proposed consolidation and issue of securities were filed August 25 with the Ohio Public Utilities Commission.

On September 1 a joint application was filed with the Interstate Commerce Commission by the Ohio Bell Telephone Co. and the Ohio State Telephone Co., asking for a certificate of public interest authorizing the consolidation of the two companies. The new company will be known as the Ohio Bell Telephone Co. This is the first application of this character under the amended provision of the transportation act.

A joint hearing at Columbus by the Ohio Public Utilities Commission and the Interstate Commerce Commission on these applications was held on September 8.

It is proposed to issue $25,000,000 of common stock and $10,225,600 of preferred stock of the consolidated company in exchange for the outstanding common and preferred stock of the two constituent companies, thereby effecting a reduction of approximately $2,000,000 as compared with the stock of the two companies now outstanding.

In addition, it is proposed to issue $18,000,000 of preferred stock to provide for retiring a portion of the outstanding evidence of indebtedness of the two constituent companies previously authorized by the public utilities commission, all of which will be assumed by the consolidated company.

Combined assets of the two companies, the application states, are approximately $81,000,000, a valuation of $50,000,000 being placed upon the properties of the Ohio State Telephone Co. and $31,000,000 on those owned by the Bell interests.

Directors of the new company will be Edgar S. Bloom, Chicago, president of the Ohio and Indiana Bell Telephone companies, and vice-president of the Illinois Bell Telephone Co.; C. P. Cooper, Cleveland, general manager of the Ohio Bell Telephone Co.; Frank A. Davis, Columbus, chairman of the board of the Ohio State Telephone Co. and president of the Scioto Valley Traction Co.; F. H. Goff, Cleveland, president of the Cleveland Trust Co.; F. R. Huntington, Columbus, president the Huntington National Bank; C. Y. McVey, Cleveland, president the Ohio State Telephone Co.; E. A. Reed, Columbus, vice-president the Ohio Bell Telephone Co.; John Sherwin, Cleveland, chairman of the board of the Union Trust Co.; Allard Smith, Cleveland, vice-president Union Trust Co.; H. B. Thayer, New York, president American Telephone & Telegraph Co.; Sheldon H. Tolles, Cleveland, senior member of Tolles, Hoggsett, Ginn & Morley, Cleveland, attorneys for the Ohio Bell Telephone Co., and E. S. Wilson, New York, vice-president the American Telephone & Telegraph Co.

Nine of the 12 directors are residents of Ohio. Eight are now directors of the Ohio Bell Telephone Co., and two are now directors of the Ohio State Telephone Co.

The officers of the consolidated company named in the agreement are as follows: Chairman of the board, Edgar S. Bloom, now president of the Ohio Bell Telephone Co.; president, E. A. Reed, now vice-president of the Ohio Bell Telephone Co.; vice-presidents, C. P. Cooper and John Uprichard, now respectively general manager and vice-president and general auditor of the Ohio Bell Telephone Co.; secretary and treasurer, C. L. McNaughton, now secretary and treasurer of the Ohio Bell Telephone Co.

The Ohio Bell company operates in 73 counties of Ohio, in which territory it owns and operates 76 exchanges, serving a total of 303,746 telephone stations and 3,972 miles of toll pole lines and 35,925 miles of toll circuits.

The Ohio State company in substantially the same territory owns and operates 85 exchanges, serving a total of 143,059 telephone stations and 2,750 miles of toll pole lines and 20,961 miles of toll circuits.

Valuation of Northwestern Bell's Property in Minnesota.

The valuation of the Northwestern Bell Telephone Co. for rate-making purposes was given recently by D. F. Jurgenson, head of the engineering department of the Minnesota Railroad & Warehouse Commission as $27,066,939.75 as compared to the figure of $34,923,766.03 presented by the company several months ago.

He fixes the valuation costs of the property to be $25,052,144.49, to which he adds organization expenses of $75,525; working capital, $743,958.11; going concern value $2,459,135.66, totaling $29,013,763.26. Depreciation is figured at 12.6 per cent. Taking the 87.4 per cent remaining, the part attributable to Minnesota intrastate business is $27,066,939.75, according to Mr. Jurgenson's figures.

Mr. Jurgenson fixes the combined valuation of the Northwestern Bell and the Tri-State Telephone & Telegraph companies at $41,000,000 as against $55,000,000 the figure decided by the company's experts.

Following the testimony and the introduction of exhibits by Mr. Jurgenson at the valuation hearings, they were postponed without the setting of a future date for continuation.

First Rate Increase in Years Opposed by a Few Radicals.

The Monroe Independent Telephone Co., one of the larger of the Independent companies of Nebraska, has been granted permission by the state railway commission to increase its rates, the first time in years. All during the war period the company has been operated at a loss, but being able to command considerable lines and getting its physical property in condition to justify an increase.

Although the rates are but slightly increased, a revolt of subscribers is being fomented by some radicals among the farmers, and threats are made that many telephones will be ordered out if the company insists on the new rates. The company operates eight exchanges, with a total of 3,207 stations.

At Monroe, where the rebellion is being organized, the increase is 25 cents a month, but in actual practice it will be only about 15 cents, since the company must hereafter furnish batteries, now supplied by the subscriber, and then not until certain rural lines have been rebuilt.

Ten years ago the company asked and secured an order requiring subscribers to furnish their own batteries. The reason was that the farmers, who comprise the greater portion of its list, were in the habit of using the telephone batteries to operate whatever farm appliances they could utilize them for. When an investigation by the commission showed this to be a fact, the order was issued, and since then the farmers had to pay for their telephone batteries.

The dollar rate that has been in vogue so long not only gave the subscribers free interchange of service between all of the eight exchanges, but arrangements had been made with seven other telephone companies operating in the northeastern part of the state to permit Monroe sub-

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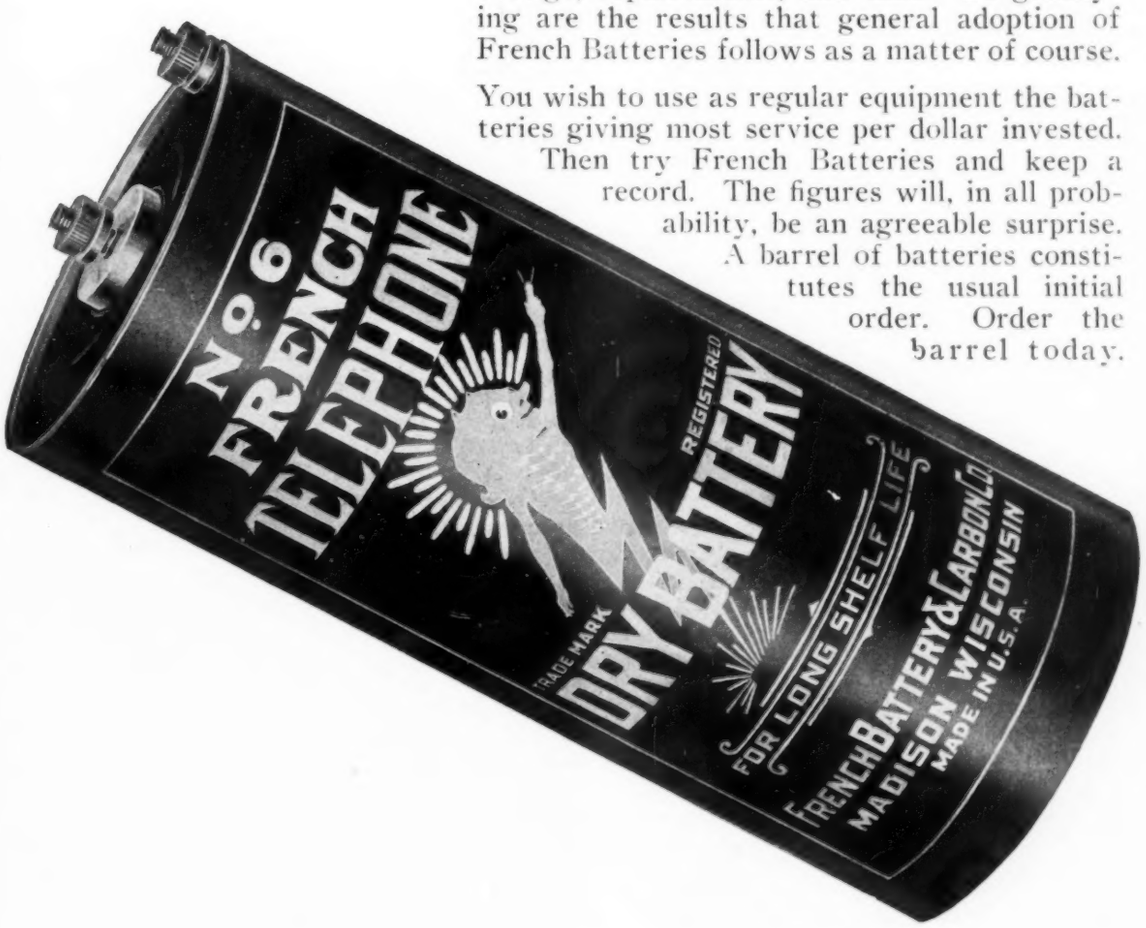

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scribers to talk without charge over their lines, the whole forming a big neighborhood with interlacing lines. At Albion, the service is metallic, but farm lines and at other exchanges grounded service is given.

The order of the commission requires the cutting off of all this free interchange with other companies, but will require the company to maintain it between its own exchanges, largely because the company does not care to excite too much opposition at one time by asking for higher rates while offering materially less free service. One exception is that the company must continue free interchange with the Shell Creek Mutual company.

The commission had previously fixed the company's property value at $106,000. Its revenues for the current year are estimated at $55,000, at the old rates, whereas it believed $78,000 revenue to be necessary to take care of expenses, divided as follows: Maintenance, $28,000; traffic, $21,000; commercial, $16,000; taxes, $2500; remainder, dividends on $135,000.

The commission cut maintenance to $21,500; traffic to $16,000; commercial to $12,000, and fixes dividends, interest and taxes at $13,280, a total of $62,750. The difference between this sum and the present revenue, it is found, will be for operators, and the rates are raised to take care of these charges.

The order also includes a readjustment of farm lines in order to get rid of present overloadings. The company has a construction program that will involve the investment of $100,000 additional, to bring the system into first-class condition. The rates authorized are as follows:

Albion: Business, $2.75; individual residence, $1.65; two-party residence, $1.40; rural residence, grounded, $1.40;
Loretto: Business, $2.75; individual residence, $1.65; two-party residence, $1.40; farm grounded, $1.40.
Genoa: Business, metallic, $2.50; business, grounded, $2.25; individual residence, $1.40; multi-party residence, $1.25; rural residence, $1.25; rural business, $2.25; private line rural, 25 cents a month for each quarter mile air line from exchange limit.
Lindsay: Business, $2; residence, individual, $1.35; multi-party residence, $1.25; rural residence, $1.25.
Monroe: Business, $2.15; individual residence, $1.35; multi-party residence, $1.25; rural residence, $1.25.
Newman Grove: Business, metallic, $2.50; business, grounded, $2.25; individual residence, $1.40; multi-party residence, grounded, $1.25; multi-party residence, metallic, $1.65; rural residence, grounded, $1.25.
Platte Center: Business, $2.15; multi-party business, $2; individual residence, $1.35; multi-party residence, $1.25; rural residence, $1.25.
Tarnov: Business, $2.15; individual residence, $1.35; multi-party residence, $1 25.

Desk sets are fixed at 25 cents a month, extensions at 25 and 50 cents, and extension bells 25 cents.

The company is ordered to set aside $21,500 a year for maintenance and depreciation reserve; it is limited to 8 per cent dividends on its capitalization, which was recently fixed; the rural rates, which represent a 25-cent increase, not to become effective until the lines have been reconstructed and due notice given the commission; toll rates to outside exchanges to be 10 cents and 14 cents, the latter for person-to-person calls; all-night service to be given at Genoa, Albion and Newman Grove; the company to furnish all batteries, and the rates to remain in effect six months for a tryout.

Mutual Shareholder Refuses to Maintain His Equipment.

The Hubbard Switchboard Co. has asked the Nebraska State Railway Commission what remedy a small company has against the shareholder in a mutual who will neither fix up his equipment so that service may be had over the lines nor pay his share of the cost of keeping the plant in running order. Because of this failure the lines are out of service part of the time, and because of this defect in service, the patrons won't pay their switching charges.

After struggling with this problem for some time, writes George Timilen, secretary, the company has sold its board and equipment to an unnamed man, who proposes to take drastic measures to secure better service conditions.

No Law, So Commission Allows Competitive Extensions.

In the absence of a law permitting it to pass upon the necessity or convenience, the Nebraska State Railway Commission has been compelled to approve the request of the Skeedee Telephone Co. of St. Edwards to issue $3,000 additional stock for the purpose of conducting a war for rural business with the Monroe Independent Telephone Co.

The Skeedee company's exchange is located between two of the larger towns operated by Monroe company, and its rural lines reach out into the same territory in some sections of Boone county. When the Monroe company recently applied for an increase in rates, the Skeedee folks, who charge a less rate than was asked for by the Monroe company, conceived the idea of adding to their business.

The commission advised the Skeedee company that there was no law that prevented it from going into the territory occupied by another company, but advised against it as an unnecessary duplication of facilities. As the company was determined to go ahead, the commission was compelled to authorize the stock issue.

Monroe company officials feel aggrieved over the proposed action of the Skeedee company's management. Not only have their relations been pleasant in the past and they have jointly owned a toll line from St. Edwards to Albion, but over the latter line, which was free, all of the subscribers of the Skeedee have had free service over all eight exchanges of the Monroe company. While the Monroe subscribers could talk freely with Skeedee's patrons, the service was not nearly so valuable since the Monroe company has eight times as many exchanges and included in these the county seat town for Skeedeeans.

The Monroe company had asked for the elimination of this free service, but the commission held this up for 60 days pending a settlement of the matter between the two companies, which may give the Monroe an opportunity to head off the threatened invasion.

Lexington, Mo. to Have Higher Telephone Rates Temporarily.

Telephone rates which will yield a return of 6.62 per cent on the investment were granted the Lafayette Telephone Co. for its Lexington, Mo. exchange by the state public service commission on August 31 as follows:

Business Stations	Old	New
Direct line	$36.00	$36.00
Extension sets	12.00	12.00
Residence Stations		
Direct line	12.00	18.00
Two-party line	12.00	15.00
Extension sets	12.00	6.00
Additional Charge for Desk Set Equipment		
Business	6.00	3.00
Residence	6.00	3.00
Mileage Beyond Initial Rate Area		
For one-quarter mile or fraction thereof		3.00
Moving charge		
Instrument moved within the room or style of instrument changed		.75
Instrument moved within the building		1.25
Instrument moved outside the building		2.25
Extension bells		3.00
Rural		
Class A		6.00
Class B		
Business		36.00
Residence		18.00

The new rates are only temporary, remaining in effect for a period of 13 months only, subject to further order by the commission. Jurisdiction was retained by the commission to make any changes or orders as might be found just before the expiration of the 13-month period. Approximately 991 local and 247 rural subscribers are served.

A detailed inventory and appraisal of the company's property, together with numerous, lengthy exhibits showing its operating revenues and expenses were presented at the hearing and a thorough investigation and report made by the com-

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mission's engineer of the figures submitted.

A reproduction cost new, less depreciation value is shown by the company's engineer as $102,294.93, based on prices during the years 1914 and 1915. The commission's engineer shows a value of $74,195.08 on the basis of the original cost to the company in constructing the plant. The commission fixed the fair value of the company's property for rate-making purposes at $85,000.

The Lafayette company commenced operations in 1898 at Lexington and Higginsville with a capital stock of $12,500. A number of years ago the Higginsville plant was sold and the money derived from the sale invested in new additions to the Lexington plant.

On the basis of 1920 operations, the company's net revenues were $29,112.98 and its expenses for the same period $23,355.23, leaving $5,757.75 or 6.77 per cent on the valuation of $85,000 to provide for a reserve for depreciation and return on the investment. Deducting 5 per cent for depreciation, left 1.77 per cent for return under the old rates. The new rates will yield a net revenue of $9,883.61 to cover both depreciation and return. This will also allow the company 5 per cent for depreciation reserve and 6.62 per cent for return.

A separate concurring opinion was filed by Commissioner Noah Simpson as follows:

I concur in the result. The company should have, in view of the present existing high money market, a return on investment of 8 per cent, if the return can be produced by reasonable rates.

From my analysis of the record evidence I reach the conclusion that an investment return of 8 per cent has been accorded the company, although the report recites an allowance of 6.62 per cent. It appears to me that the exhibits are conclusively patent upon their face to show deferred maintenance.

The deferred maintenance expenditures during the period covered by the expense exhibits are not representative of an average normal year's operating expense and in my opinion are inclusive of excess operating charges whereby, when deducted therefrom, will give to the company a full 8 per cent yearly investment return upon the base of $85,000.

Bell Seeks Permission to Purchase Pittsburgh Company.

A $2,500,000 merger which will mark the passing of the Independents in the telephone field in the Pittsburgh district was before the Pennsylvania Public Service Commission at a hearing in Pittsburgh September 8, upon the application of the Bell Telephone Co. of Pennsylvania for permission to purchase the assets and good will of the Pittsburgh & Allegheny Telephone Co.

The public service commission, it is expected, will decree that all Pittsburgh & Allegheny subscribers be offered Bell service, and that all existing P. & A. contracts be taken over by the Bell company.

The Pittsburgh & Allegheny, it is understood, has outstanding about $1,500,000 in bonds which the Bell company is believed to be willing to take over, and to pay, in addition, another $1,000,000, or a total of $2,500,000.

The Pittsburgh & Allegheny Telephone Co., incorporated under the laws of Pennsylvania, is capitalized at $5,000,000. Cyrus Huling of Columbus, Ohio, is president.

The Telephone Rate Increase at Sand Springs, Okla.

In last week's issue some mention was made of the order of the Oklahoma Corporation Commission on August 22 granting an increase in rates to the Sand Springs Telephone Co., of Sand Springs. Only the rates for individual line service were given. Here are old and new annual local and rural rates for individual and party lines, which became effective September 1:

	Old	New
Business, 1-party	$36	$39
Residence, one-party	24	24
Residence, two-party		21
Business extension		12
Residence extension		9
Rural-owned station, multi-party		24
Rural-switched stations		6

Figures were presented by the company at the hearing showing a value of the plant per station as of December 31 of last year of $67 and as of April 30 of this year of $88.13. During the interim between these dates the plant was changed from magneto to common battery equipment. An investigation by the commission's engineer of the investment in plants similar in size to the one at Sand Springs showed that the average per station value was $70 for common battery plants.

The company claimed a valuation of $44,065, but after deducting several items included in the valuation which the commission found were not useful in the conduct of the company's business, the commission fixed the fair value for rate-making purposes as $37,270.

Exhibits presented by the company showing its operations for a period of 11 months, ending December 31, 1920, showed operating revenues amounting to $16,300, and expenses of $17,812, leaving a deficit for the 11-month period of $1,512.

The commission's engineer developed as a figure representing revenues the sum of $12,041 and expenses $10,401. Applying these figures to a 12-month period instead of 11, the resulting figures are revenues, $13,136 and expenditures $11,346, leaving a net income from operation of $1,790.

The differences between the commission's engineer's figures and those of the company are accounted for by the fact that the company included revenues for 11 months of $4,259 representing tolls collected but not paid by it to the Southwestern Bell Telephone Co. The same amount deducted from the expenditures together with an item of $2,430 charged to depreciation and an amount of $722 as interest, which are not current operating expenses, leaves the net income reported by the commission's engineer, namely $1,790.

Net Annual Telephone Rates Are Higher in Two Rivers, Wis.

On August 31, the Wisconsin Railroad Commission authorized the Two Rivers Telephone Co. to increase its net annual rates for telephone service, effective September 1, as follows:

	Old	New
Business, one-party	$24	$30
Business, two-party	21	27
Residence, one-party	18	24
Residence, two-party	12	21
Residence, four-party	12	18
Extension	9	9
Switching service	6	6

The company operates a telephone system in the city of Two Rivers, serving 838 subscribers connected to its lines and 232 subscribers on lines owned by other companies. The lines owned by the company are entirely local metallic lines, all rural lines being owned by rural companies. The switchboard is rented from the Wisconsin Telephone Co.

The book value of the property and plant of the company is $24,402.14.

Ordered to Reduce Number of Subscribers Per Line.

The Matteson Telephone Co. was ordered by the Wisconsin Railroad Commission on August 23 to make full metallic circuits of its lines extending northeast from Clintonville and string such additional metallic circuits as may be necessary to reduce the number of subscribers on these lines to a maximum of 12. It was also ordered to take care of such additional subscribers as may apply for telephone service. December 31, 1921 was considered a reasonable time within which to comply with this order.

The order was handed down as the result of informal complaint made to the commission alleging that one of the lines was in run-down condition and asking that the company be compelled to properly repair it. Accordingly, a hearing was held on the commission's own motion for an investigation of the condition of the line.

It appears that on July 15, 1920 an order was entered by the railroad commission directing the company to reduce the number of subscribers on its lines within a specified time. The time was postponed from time to time at the request

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of the company so that the day of expirement is now October 1, 1921.

The company pointed out that it has undertaken to make its entire system metallic, reducing the number of subscribers on each line as required by the commission at the same time. Difficulty has been experienced in securing the necessary funds and for this reason, officials of the company stated, it has proceeded more slowly that it had originally planned. Work is now in progress on a line extending from the Bear Creek exchange and it was stated that as soon as this line is completed and the necessary funds secured, work on the line complained of in this proceeding will be undertaken. It was estimated that the work of improving the lines will cost $2,000.

Subscribers at Rio, Wis. to Pay Higher Telephone Rates.

Authority to increase its telephone rates as follows was granted the People's Telephone Co., of Rio, Wis. by the state railroad commission on August 27:

	Old (per month)	New (per quarter)
Rural subscribers, grounded	$1.25	$3.75
Rural subscribers, metallic	1.60	4.80

An additional charge of 25 cents per month is made for each subscriber located within the first mile and a further additional charge of 25 cents for each additional mile is to be charged to all subscribers located outside the six mile radius limit and served on metallic lines.

Approximately 676 local and 1,057 rural subscribers are served by the People's company at its Rio, Fox Lake, Randolph, Cambria, and Fall River exchanges. Nearly 159 subscribers will be added by the purchase of the Leed company's lines.

The People's company entered into a contract with the Leeds Farmer's Telephone Co. on May 12, 1921 whereby it purchased from the Leeds company certain lines and equipment. The agreement provides for the payment of $25 per station for telephone and line, including the Hampden switchboard, but is not binding until 75 per cent of the subscribers affected located at stations outside the five mile zone from the Rio central consent to be taken over and the railroad commission approves a bond issue to enable the People's company to improve the new property.

Summary of Commission Rulings and Schedule of Hearings.

INTERSTATE COMMERCE COMMISSION.

September 1: Joint petition filed by the Ohio Bell Telephone Co. and the Ohio State Telephone Co. asking authority to consolidate.

ILLINOIS.

August 26: The Illinois Bell Telephone Co. authorized to issue $10,000,000 additional capital stock. Of this issue 98 per cent is taken by present stockholders of the American Telephone & Telegraph Co., while the other 2 per cent is offered to present stockholders of the Illinois company.

September 8: Hearing at Springfield in the matter of proposed advance in rates for the Murphysboro Telephone Co. in Murphysboro and 23 other municipalities; protest filed by mayor and citizens of Carbondale against rates and service; protest filed by city of Anna against service at Anna; supplemental application of Murphysboro company for extension of time within which to comply with order of commission.

September 8: Hearing at Springfield on application of the LaHarpe Telephone Co., of LaHarpe, for authority to increase rates.

MICHIGAN.

September 2: Hearing at Lansing on citation order entered requiring the Michigan State Telephone Co. to show cause why its rates in the city of Detroit should not be reduced because of alleged poor service and failure of the company to make certain needed improvements.

MINNESOTA.

September 16: Hearing at Willow River on application of the Willow River Telephone Co. for authority to increase its local and rural rates and to place in effect service connection and other miscellaneous charges at Willow River.

September 20: Hearing at Gary on application of the Gary Telephone Co. for authority to increase its local and rural rates at Gary.

MISSOURI.

August 29: Rates granted the Grand River Telephone Co. for its exchanges at Mt. Moriah, Cainsville, Mill Grove, Modena, Goshen, and Saline and the country lines in the territory adjacent to Princeton in order entered June 18, 1919 for a temporary period of 13 months, made permanent.

August 31: The Lafayette Telephone Co., of Lexington, authorized to increase rates temporarily.

August 29: The LaPlata Telephone Co., of LaPlata, authorized to continue in effect present schedules of rates for a further period of 13 months.

NEBRASKA.

August 31: Application of the Skeedee Telephone Co. for permission to issue $3,000 worth of additional stock found reasonable and order issued with proviso that reports with respect to the sale and disposition of proceeds be filed with the commission.

August 31: In the matter of the application of the Nuckolls County Independent Telephone Co. for permission to continue in effect the existing schedule of emergency rates expiring by limitation on September 1; in view of the fact that no material change has taken place in the conditions which justified the original order, commission orders continuance of rates for an indefinite period.

September 1: In the matter of the application of the Venango Telephone Co. for permission to issue $3,000 additional stock; commission finds request reasonable, that additional funds are needed for the purpose of payment of debts incurred in building new exchange, and authorizes issuance of the stock.

NEW MEXICO.

September 12: Hearing at Albuquerque on complaints against the recent raise in rates by the Mountain States Telephone & Telegraph Co. in Albuquerque. This hearing is contingent on the company's acceptance of the provisions of constitutional amendment No. 5, giving the commission authority to call a hearing before September 20 when the amendment will be voted upon.

NEW YORK.

August 26: The city of Rochester granted a rehearing of its protest against the installation of measured rates by the New York Telephone Co. in that city.

September 8: Rehearing at Albany of complaint of the city of Rochester against the Rochester Telephone Corp. in re rates proposed to be charged August 1; also asking suspension of proposed rates and establishment of temporary rates during suspension period.

September 8: Hearing at Albany on application of the city of Syracuse for a rehearing of its complaint against the rates of the New York Telephone Co. in Syracuse.

September 8: Hearing at Albany on complaint of Walter R. Stone as mayor of Syracuse against the New York Telephone Co. in re rates in said city effective December 1, 1919.

September 8: Hearing at Albany on complaint of Harry H. Farmer as mayor of Syracuse against the New York Telephone Co. in re increase in rates in said city effective September 1, 1920. This hearing is on the question of whether or not the rehearing asked for by the city of Syracuse shall be granted.

NORTH DAKOTA.

September 21: Hearing at Northgate for investigation of petition of the Farmers & Merchants Telephone Co. for authority to close its Flaxton exchange.

OHIO.

September 8: Joint hearing at Columbus before the state public utilities commission and the Interstate Commerce Commission on applications of the Ohio State Telephone Co. and the Ohio Bell Telephone Co. for permission to consummate the proposed consolidation and issue necessary securities for its financing.

OKLAHOMA.

September 12: Hearing at Oklahoma City on application of hotel owners for authority to charge 10 cents for local calls to guests. The commission has issued a temporary order setting 5 cents as the maximum charge for this service.

PENNSYLVANIA.

September 8: Hearing at Pittsburgh on application of the Bell Telephone Co. of Pennsylvania for permission to acquire by purchase the assets and good will of the Pittsburgh & Allegheny Telephone Co.

WISCONSIN.

August 23: The Matteson Telephone Co. ordered to make full metallic circuits of certain of its lines extending northeast from Clintonville and to reduce the number of subscribers on each line to a maximum of 12.

August 27: The People's Telephone Co., of Rio, authorized to increase its local and rural rates.

August 31: The Two Rivers Telephone Co., of Two Rivers, authorized to increase its local and rural rates, effective September 1.

September 7: Hearing at Madison on application of the Morgan Telephone Co., of Morgan, for authority to increase its rates for telephone service. U-2561.

September 16: Hearing at Madison on the application of the Central Wisconsin Telephone Co., of Black River Falls, for authority to increase certain rates. U-2553.

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Record of Telephone Patents

1,386,683. August 9, 1921; filed March 19, 1918. TELEPHONE SYSTEM; four claims; W. T. Booth, East Orange, N. J.; assigned to Western Electric Co. In this system which comprises a number of groups of interconnected stations, current regulating means are individual to and associated with each station. Provision is made for interconnecting any two selected stations independently of the others, and to maintain the connection of the selected stations with the associated current regulating means and the common source of current, thereby insuring substantially the same amount of current applied thereto.

1,386,686. August 9, 1921; filed January 7, 1915; CONTROLLING SYSTEM FOR AUTOMATIC SWITCHING MEANS; eight claims; A. M. Bullard, deceased and J. N. Reynolds, Greenwich, Conn.; assigned to Western Electric Co. In this semi-automatic system means are responsive to the successive operation of keys of a sender set for causing the controlling devices of the set to assume set positions corresponding to the keys depressed. A series of mechanical switches are governed in their operation by the subsequent movement of the controlling devices, the movement of the controlling devices being caused in turn by the operation of the mechanical switches.

1,386,688. August 9, 1921; filed June 5, 1919; TELEPHONE EXCHANGE SYSTEM; three claims; H. P. Clausen, Mount Vernon, N. Y. and C. L. Goodrum, New York; assigned to Western Electric Co. The feature of this automatic system is the provision for extending a calling line to any one line of a group of lines terminating in several groups of terminals in various orders of subordination. Dependent upon the busy condition of the line, the calling line is automatically extended to the next-in-turn subordinate line.

1,386,689. August 9, 1921; filed June 6, 1918. TELEPHONE SYSTEM; nine claims; R. D. Conway, Chatham, N. J.; assigned to Western Electric Co. In this service-observing system, a relay, with a predetermined resistance associated therewith, is energized upon the connection of the cord circuit with the telephone line. Means controlled by the energization of the relay actuate a service-observing signal and connects the resistance in circuit with the relay to thereby cause its release.

1,386,390. August 9, 1921; filed October 23, 1918. TELEPHONE SYSTEM; seven claims; G. C. Crawford, East Orange, N. J.; assigned to Western Electric Co. The feature of this substation ringer is the provision for automatically and abnormally increasing the impedance of the ringer during conversation over the line between the stations. by means of a supplementary laminated core.

1,386,697. August 9, 1921; filed July 14, 1920. TESTING APPARATUS; five claims; H. Fletcher, New York, and F. J. Strassner, Newark, N. J.; assigned to Western Electric Co. In this method of comparatively testing the quality of a transmitter, the transmitter is connected to a tone-producing relation with a receiver of known transmission efficiency, an inclosed air column separating them. The electrical circuit of the receiver is reversed so that the quality of the transmitter may be determined by the comparison of the pitch of the tone so produced with the pitch of the tone produced when a transmitter of known transmission efficiency and quality is subjected to similar conditions.

1,386,701. August 9, 1921; filed August 14, 1916. COIN-COLLECT SYSTEM; 11 claims; C. L. Goodrum, Brooklyn, N. Y.; assigned to Western Electric Co. The feature of this automatic means for periodically collecting toll at the substation is a polarized relay which is located at each end of these substations. This relay is in series with its associated transmitting apparatus and operates jointly with other apparatus to disable the transmitting equipment at the charge substation. Token-controlled means at the calling substation operate to render the conversation continuous during the operation of the charging means.

1,386,722. August 9, 1921; filed June 24, 1919. DIAPHRAGM; six claims; G. E. Mather, East Orange, N. J.; assigned to Western Electric Co. A method of constructing a diaphragm is described. A reinforcing member is placed between two partially vulcanized members and the assembled parts placed in a mold. They are then subjected to pressure and heat to cause further vulcanization.

1,386,728. August 9, 1921; filed August 27, 1918. MACHINE SWITCHING TELEPHONE SYSTEM; 27 claims; L. Polinkowsky, New York; assigned to Western Electric Co. A selectively operable switching device interconnects two of a number of lines. An operator's keyboard is provided together with a number of register sets, each of which comprises a set of number relays, a set of counting relays, and a set of switching relays. Means under control of the keyboard variably operate the number of relays of any one of the register sets, while means jointly controlled by the switching device and the operated number relays variably operate the associated counting relays. The counting relays in turn act to operate the associated switching relays. Provision is made for restricting the control of the keyboard to the number of relays of one register set at a time.

1,386,730. August 9, 1921; filed December 31, 1919. TELEPHONE EXCHANGE SYSTEM; 10 claims; A. Raynsford, New York; assigned to Western Electric Co. In this automatic system, telephone lines of different classes terminate at one office which is connected to a second office by two-wire trunks which terminate at an operator's position. Automatic switches at the first office are adapted to be set under the control of the calling subscriber to seize one of the trunks. Provision is made for immediately automatically indicating the class of the calling line to the operator at the second office as soon as her cord circuit is connected to the seized trunk.

1,386,731. August 9, 1921; filed April 12, 1919. VACUUM TUBE REPEATER CIRCUITS; nine claims; H. S. Reeve, East Orange, N. J.; assigned to Western Electric Co. This multi-stage repeater is comprised of a number of vacuum tubes, each having a cathode and anode and a controlled electrode. The resistance is bridged across one of the cathodes and a connection made from a point on the resistance to the control electrode of another of the tubes.

1,386,744. August 9, 1921; filed July 11, 1918. TELEPHONE AND MICRO-TELEPHONE; four claims; R. A. Baron van Lynden, Utricht, Netherlands; assigned to American Thermophone Co., Boston, Mass. This telephone comprises a handle member and another member slidably connected therewith and carrying the telephonic apparatus proper. A spring tends to separate the members while a switch is operated by the relative movement of the members.

1,386,747. August 9, 1921; filed July 11, 1918. TELEPHONE EXCHANGE SYSTEM; four claims; C. White, East Orange, N. J.; assigned to Western Electric Co. In this system is a plural service trunk circuit for reciprocal operation between two stations. Signal-controlled means are located at each station for each service, means for different services being responsive to signaling currents of different characteristics. Means at each station selectively impress currents of different characteristics on the trunk circuits to operate the associated signal controlled means at the other station. A response of one signal-controlled means acts to render the other signal-control means at the same station unresponsive.

1,386,749. August 9, 1921; filed April 14, 1919. CALL DISTRIBUTING SYSTEM; six claims; S. B. Williams, Jr., Brooklyn, N. Y.; assigned to Western Electric Co. Service-charging apparatus is associated with the calling line and a key for operating it is associated with the connecting current. Provision is made for automatically disconnecting the connecting circuit from the calling line while means actuated in operating the charging key, prevent the operation of the automatic disconnecting means.

1,386,975. August 9, 1921; filed Octo-23, 1920. DISINFECTING DEVICE FOR TELEPHONE AND OTHER USES; one claim; N. B. Smith, Boston, Mass.; assigned to C. A. Goulston, Boston. This device consists of front and back members stitched together around their lower edges and having upwardly extending perforated suspension tabs, capable of being separated to admit a pad. The front member is perforated to allow the escape of fumes into the mouthpiece, while a disinfecting pad is inserted between the two members, opposite the perforation in the front member.

ADLETS

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